

# Moose Management Report

of survey-inventory activities  
1 July 1999–30 June 2001

Carole Healy, Editor  
Alaska Department of Fish and Game  
Division of Wildlife Conservation  
December 2002



ADF&G

Please note that population and harvest data in this report are estimates and may be refined at a later date.

If this report is used in its entirety, please reference as: Alaska Department of Fish and Game. 2002. Moose management report of survey-inventory activities 1 July 1999–30 June 2001. C. Healy, editor. Project 1.0. Juneau, Alaska.

If used in part, the reference would include the author's name, unit number, and page numbers. Authors' names and the reference for using part of this report can be found at the end of each unit section.

Funded in part through Federal Aid in Wildlife Restoration, Proj. 1, Grants W-27-3 and W-27-4.



## **MOOSE MANAGEMENT REPORT**

From: 1 July 1999  
To: 30 June 2001

### **LOCATION**

**GAME MANAGEMENT UNIT:** 1A (5,300 mi<sup>2</sup>) and 2 (3,600 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** That portion of Unit 1 lying south of Lemesurier Point, including all drainages into Behm Canal and excluding all drainages into Ernest Sound. Unit 2: Prince of Wales Island and adjacent islands south of Sumner Strait and west of Kashevarof Passage.

### **BACKGROUND**

Most of the Unit 1A moose population is localized in the Unuk River drainage and appears stable. Heavy timber in a narrow valley with braided river channels makes moose observation difficult. The best population estimates are based on track densities and distribution in fresh snow complimenting aerial surveys. Good habitat is limited and moose numbers are low. The harvest is sporadic, ranging from 0–8 per year. Unit 1A moose are believed to be *Alces alces andersonii*, and likely emigrated from interior British Columbia via the Unuk River valley.

The United States Forest Service (USFS) prepared a vegetative type map of the Chickamin River valley, resulting from 1962 and 1963 field investigations (Burris 1964). The study suggested that sufficient forage was present to support moose. Measuring boards were installed to determine snow depth to ascertain if winter conditions were suitable for moose. The Chickamin supported a few moose before supplemental transplants in 1963 and 1964. These moose were captured on the Chickaloon Flats near Anchorage (Burris 1964). A short-term increase followed the release and several bulls were harvested during open hunting seasons. Chickamin moose populations subsequently declined and we have received no reports of moose there in recent years; recent aerial surveys suggest no moose remain there. Moose are occasionally reported from other parts of Unit 1A including Revillagigedo Island and along the Cleveland Peninsula.

Although present-day rumors suggest that moose occurred sporadically on Prince of Wales Island in Unit 2 as far back as the 1940's, ADF&G received its first plausible report of moose in the unit in 1987 when USFS staff reported a cow and calf near Snakey Lakes. During fall 1991 a cow moose was struck by a highway vehicle near Control Lake. In June 1993 a USFS employee photographed a cow moose walking along the 30 Road, located roughly 0.5 miles south of Ratz Harbor. One bull was poached near Hollis in fall 1996. Additional reports indicate that a population of moose, of unknown size and composition, inhabits the central portion of Prince of Wales Island. Currently there is no open moose hunting season in Unit 2.

## MANAGEMENT DIRECTION

### MANAGEMENT OBJECTIVES

The following moose management objectives for Unit 1A are based on biological data and input from the public.

	<u>Plan Objective</u>	<u>1999</u>	<u>2000</u>
Post-hunt numbers	35	Unknown	Unknown
Annual hunter kill	3	1	1
Number of hunters	20	20	27
Hunter-days of effort	90	104	109
Hunter success	15%	5%	4%

### METHODS

Moose surveys are flown each winter (December–February) when weather and snow conditions become favorable.

### RESULTS AND DISCUSSION

#### POPULATION STATUS AND TREND

##### *Population Size*

Data are insufficient to make a quantitative determination of Unit 1A moose population trends during the past 5 years. However, moose populations appear to be stable at a low density and carrying capacity is estimated to be low. Healthy brown bear, black bear, and wolf populations probably account for substantial mortality in this area, particularly on calves.

Increasing reports of moose in Unit 2 may indicate a growing moose population, or simply be a function of increased human access into once remote areas. No population data are available for Unit 2.

##### *Population Composition*

Only a few thorough Unuk River moose surveys have ever been completed. Crude population estimates are based on track density and distribution rather than relying only on the number or composition of moose observed. A complete survey was flown under ideal light and snow conditions during February 2001. A total of 16 moose were observed during one hour of flying, enumerating 11 cows, 3 bulls, and 2 calves. Additional track distribution in fresh snow suggested the total moose population is between 35–50 moose within the Alaska portion of the drainage.

A survey during February 2000 along the Chickamin drainage, under ideal survey conditions, confirmed there are no moose in the area.

### *Distribution and Movements*

Moose are not restricted from moving between Canada and the US along mainland drainages. However, moose have never been marked or collared in this area, and consequently we know little about their seasonal movement along the Unuk. Some of the best habitat along the river occurs upstream in Canada and likely supports a significant number of moose outside of Unit 1A. Some of those moose undoubtedly spend time on the US side of the border.

## **MORTALITY**

### **HARVEST**

<u>Season and bag limit</u>	<u>Resident and nonresident hunters</u>
Unit 1A	Sept. 15–Oct. 15 (General hunt only)
One bull by registration permit only	
Unit 2	No open season.

Board of Game Actions and Emergency Orders. No regulatory changes were made by the Board of Game during this report period.

Hunter Harvest. The Unit 1A 8-year mean harvest is 3 bulls. One moose was harvested during each of the past 2 years. The antler spreads for the bulls in 1999 and 2000 measured 19.5 inches and 25 inches, respectively. The lack of participation and poor weather conditions during fall 1999 explain the low harvest.

Permit Hunts. During fall 1999, 34 individuals obtained Unit 1A moose registration permits, of which 20 hunted. This was the lowest number of registered hunters during the past 8 years and well below the long-term average ( $\bar{x}$  = 60.1, range 34–81). Also in 1999, only 20 hunters reported going afield, which is the lowest hunter effort since the start of the Unit 1A registration hunt (range 20–48).

During fall 2000, 51 individuals obtained registration permits and 27 actually hunted.

Hunter Residency and Success. Unit 1A moose hunters continue to be primarily Ketchikan and Metlakatla residents. Several of these hunters own cabins on the Unuk River. All successful hunters were Ketchikan residents (Table 2). Total hunter days were much lower during this report period than previous years, probably due to poor weather conditions during the hunting seasons.

Harvest Chronology. Both moose harvested during the 2-year report period were taken during the first week of the season (Table 2).

Transport Methods. Most hunters used boats to access the Unuk River in 1999 and 2000 (Table 4).

## **OTHER MORTALITY**

The extent of wolf, black bear, and brown bear mortality on adult and calf moose in Unit 1A is unknown.

## **CONCLUSIONS AND RECOMMENDATIONS**

Access is difficult to the small Unit 1A moose population on the Unuk River drainage and the hunt attracts few hunters, most of which are local residents. Due to limited suitable habitat carrying capacity is low. Most moose harvested are young bulls with relatively small antlers, which have historically averaged about 30 inches in width. Winter weather, snow conditions, and abundant predators are likely limiting the moose population, and consequently we do not expect moose numbers to exceed current levels.

The Unit 1A registration permit provides accurate hunt-based data. The harvest and hunter effort during this report period was lower compared to recent years. It is probable that reduced hunter effort and poor weather during the season is to blame for the low harvest rather than a reduced number of moose along the Unuk.

We will continue to gather information about this moose population and we anticipate proposals to the Federal Subsistence Board asking to convert this hunt to favor federally qualified rural residents only.

We will continue to document Unit 2 moose sightings and we recommend that Unit 2 remain closed to moose hunting.

## **LITERATURE CITED**

BURRIS, O.E. 1964. Alaska wildlife stocking. Alaska Dept. of Fish and Game, Fed. Aid in Wildl. Rest. Prog. Rept. Project W-11-D-1, Juneau.

### **PREPARED BY:**

Boyd Porter  
Wildlife Biologist III

### **SUBMITTED BY:**

Bruce Dinneford  
Management Coordinator

Please cite any information taken from this section, and reference as:

Porter, B. 2002. Unit 1A moose management report. Pages 1–6 in C. Healy, editor. Moose management report of survey and inventory activities 1 July 1999–30 June 2001. Alaska Department of Fish and Game. Project 1.0. Juneau, Alaska.

Table 1 Unit 1A moose harvest data by permit hunt, regulatory years 1993 through 2000

Hunt	Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Harvest						Total harvest
						Males	(%)	Females	(%)	Unk	(%)	
RM022	1993	62	17	42	3	3	(100)	0	(0)	0	(0)	3
	1994	81 <sup>a</sup>	33	41	6	6	(100)	0	(0)	0	(0)	6
	1995	78	33	43	2	2	(67)	1 <sup>b</sup>	(0)	0	(0)	3
	1996	63	27	32	4	4	(100)	0	(0)	0	(0)	4
	1997	59	27	28	4	4	(100)	0	(0)	0	(0)	4
	1998	53	24	26	3	3	(100)	0	(0)	0	(0)	3
	1999	34	14	19	1	1	(100)	0	(0)	0	(0)	1
	2000	51	24	26	1	1	(100)	0	(0)	0	(0)	1
	Average	60	25	32	3	3	(96)	0	(0)	0	(0)	3

<sup>a</sup> One permit not returned<sup>b</sup> Illegal cow kill

Table 2 Unit 1A moose hunter residency and success, regulatory years 1993 through 2000

Year	Successful					Unsuccessful					Total hunters
	Local <sup>a</sup> resident	Nonlocal resident	Nonresident	Total	(%)	Local <sup>a</sup> resident	Nonlocal resident	Nonresident	Total	(%)	
1993	3	0	0	3	(7)	39	3	0	42	(93)	45
1994	4	2	0	6	(13)	39	2	0	41	(87)	47
1995	2	2	0	2	(4)	36	6	1	43	(96)	45
1996	4	0	0	4	(11)	27	5	0	32	(89)	36
1997	3	1	0	4	(13)	27	1	0	28	(87)	32
1998	3	0	0	3	(10)	24	2	0	26	(90)	29
1999	1	0	0	1	(5)	16	3	0	19	(95)	20
2000	1	0	0	1	(4)	26	0	0	26	(96)	27
Average	2.6	0.6	0	3	8.4	29.3	2.8	0	32.1	91.6	35.1

<sup>a</sup> Local resident hunters reside in Unit 1A.

Table 3 Unit 1A moose harvest chronology, regulatory years 1993 through 2000

<i>YEAR</i>	15–21 Sept	(%)	22–28 Sept	(%)	29 Sept–5 Oct	(%)	6–15 Oct	(%)	<i>n</i>
1993	0	(0)	0	(0)	1	(33)	2	(67)	3
1994	1	(17)	1	(17)	0	(0)	4	(66)	6
1995	1	(50)	0	(0)	1	(50)	0	(0)	2
1996	2	(50)	0	(0)	0	(0)	2	(50)	4
1997	1	(25)	0	(0)	2	(50)	1	(25)	4
1998	2	(67)	0	(0)	0	(0)	1	(33)	3
1999	1	(100)	0	(0)	0	(0)	0	(0)	1
2000	1	(100)	0	(0)	0	(0)	0	(0)	1

Table 4 Unit 1A moose harvest percent by transport method, regulatory years 1993 through 2000

Year	Harvest percent by transport method										<i>n</i>
	Airplane	(%)	Boat	(%)	Highway vehicle	(%)	Off-road vehicle	(%)	Unk	(%)	
1993	1	(33)	2	(67)	0	(0)	0	(0)	0	(0)	3
1994	1	(17)	5	(83)	0	(0)	0	(0)	0	(0)	6
1995	0	(0)	2	(100)	0	(0)	0	(0)	0	(0)	2
1996	1	(25)	3	(75)	0	(0)	0	(0)	0	(0)	4
1997	0	(0)	4	(100)	0	(0)	0	(0)	0	(0)	4
1998	2	(67)	1	(33)	0	(0)	0	(0)	0	(0)	3
1999	0	(0)	1	(100)	0	(0)	0	(0)	0	(0)	1
2000	0	(0)	1	(100)	0	(0)	0	(0)	0	(0)	1



**SPECIES**  
**MANAGEMENT REPORT**

**Alaska Department of Fish and Game**  
**Division of Wildlife Conservation**  
(907) 465-4190 PO BOX 25526  
JUNEAU, AK 99802-5526

**MOOSE MANAGEMENT REPORT**

From: 1 July 1999  
To: 30 June 2001

**LOCATION**

**GAME MANAGEMENT UNIT:** 1B (3,000 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Southeast Alaska mainland, Cape Fanshaw to Lemesurier Point

**BACKGROUND**

**HABITAT DESCRIPTION**

Isolated populations of moose (*Alces alces*) occur in Unit 1B and are believed to be the *andersonii* subspecies. They emigrated from interior British Columbia via the Coast Range and the Stikine River valley around the turn of the 20<sup>th</sup> century.

Moose occur in several areas of Unit 1B, with concentrations near Thomas Bay and along the Stikine River. Suitable habitat adjacent to Bradfield Canal has not been colonized, but moose do occur around Virginia Lake, Mill Creek, and Aaron Creek. LeConte Glacier and Bay divide Unit 1B for moose management purposes north and west of the Stikine River.

The Thomas Bay moose population is isolated from populations in Canada by the Coast Mountains. These moose occupy an area that was heavily logged from the late 1950s through the early 1970s. The Thomas Bay moose population may decline significantly as conifer re-growth in clearcuts matures and reduces forage production.

Moose inhabiting the Alaska portion of the Stikine drainage represent the westernmost tip of a mainland population emanating from Canada. The Alaska portion of this population was estimated at 300 animals in 1983 (Craighead et al. 1984). Since 1983 most winters have been mild and the moose population, based on harvest records and subjective impressions, appeared to increase until 1989.

**HUMAN USE HISTORY**

Moose are indigenous but recently established in Unit 1B. Since the mid-20<sup>th</sup> century, isolated populations of moose on the American side of the Stikine River valley and at Thomas Bay have been hunted for food and trophies.

*Regulatory history*

From 1959 to present, the Stikine River moose season has generally been from September 15 through October 15 with a one-bull limit. From 1972 to 1974, however, the harvest of antlerless

moose was allowed by permit only. From 1990 to 1992 a harvest ticket was required to hunt moose on the Stikine, and since 1993 a registration permit (RM038) has been required. Antler restrictions were implemented on the Stikine in 1995, defining a legal bull as having a spike-fork, 50-inch antler spread, or 3 or more brow tines on at least one side.

From 1959 to 1981 the Thomas Bay season was bulls-only and typically 31 days long, September 15 through October 15. Since 1978 the use of motorized land vehicles to hunt moose has been prohibited at Thomas Bay. From 1980 to 1994 the moose season was from October 1 through 15. Since 1984 a registration permit has been required to hunt moose, and antler restrictions were implemented defining a legal bull as having a spike, fork, or at least 50-inch antlers. In 1993, the antler restriction was amended to include bulls with 3 or more brow tines on at least one side. Since 1995 the season has been September 15 through October 15.

Action by the Board of Game effective July 1, 1995 put all of Units 1B and 3 and that portion of Unit 1C south of Point Hobart under one registration permit hunt (RM038). A legal moose for this registration permit hunt is a bull with spike/fork or 50-inch antlers or 3 brow tines on at least one antler.

#### *Historical harvest patterns*

Average annual harvest of Stikine River moose from 1952 through 1959 was 26. During the 1960s the average harvest was 28, during the 1970s it was 26 and in the 1980s it was 39. The 1971 and 1972 harvests included 18 and 22 cows, respectively. From 1990 to 1998 the average annual harvest was 20, however in 1994 the moose season was closed by emergency order in that portion of Unit 1B south of LeConte Bay and Glacier due to a lack of mature breeding bulls in the population.

The average annual harvest of bulls from Thomas Bay during the 1950s was 5, in the 1960s it was 8, in the 1970s it was 10, in the 1980s it was 18 and from 1990–1998 the annual harvest of bulls was 21. A scarcity of calves prompted closure of the season in 1982 and 1983.

#### *Historical harvest locations*

The vast majority of moose harvested in the unit are taken either from in the Stikine River drainage or at Thomas Bay. In recent years the distribution of moose in Unit 1B appears to be expanding, fed by source populations on the Stikine and at Thomas Bay.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

The following moose management objectives for Unit 1B are based on biological data and input from the public.

#### Stikine River

	<u>Plan Objective</u>	<u>1999</u>	<u>2000</u>
Post-hunt numbers	300	N/A	N/A
Annual hunter kill	30	20	14

Number of hunters	250	185	165
Hunter-days of effort	1,750	1,454	1,302
Hunter success	12%	11%	8%

#### Thomas Bay

	<u>Plan Objective</u>	<u>1999</u>	<u>2000</u>
Post-hunt numbers	200	N/A	N/A
Annual hunter kill	20	20	6
Number of hunters	160	107	104
Hunter-days of effort	675	746	753
Hunter success	12%	19%	6%

## **METHODS**

Late winter surveys were flown along the Stikine River valley. Hunters and harvested moose were checked in the field during the Stikine River and Thomas Bay hunts. Field data was used to reconcile written hunter reports. Since 1997 hunters in Unit 1B have been asked on registration permits to report the number of moose (by sex and age class), wolves, and bears they observed during the hunting season.

## **RESULTS AND DISCUSSION**

### **POPULATION STATUS AND TREND**

#### *Population Size*

In 1983 the Stikine River population was estimated at 300 moose and increasing (Craighead, et al. 1984). Post-1983 harvest levels and subjective impressions suggested the Stikine population slowly increased and then began to decrease in 1988. The percentage of calves surviving to late winter declined from 1980 to 1989 and remained low until 1994. In 1995, 1996, and 1998 the percentage of calves surviving to late winter increased to 18%, 22%, and 24%, respectively (Table 1). Hunters took 57 bulls in 1988 and the kill dropped each succeeding year to a low of 3 in 1994 (taken under a federal permit; the state season was closed by emergency order in 1994).

The Thomas Bay population was estimated at 180 moose the late 1970s (ADFG files, Petersburg). Based on increased harvest and observed habitat utilization the current population is probably larger.

The Thomas Bay population in northern Unit 1B now appears to be stable at a high density. The Stikine River population, although increasing from 1994 through 1999, now appears to be decreasing and at moderate density.

#### *Population Composition*

Table 1 shows the results of all Stikine River valley surveys since 1989/90. Dense coniferous forest, variable snowfall, and inclement weather make adequate surveys difficult. No attempt

was made to differentiate between bulls and cows, but adults and calves were differentiated during late winter aerial surveys.

Information on the number of moose observed by hunters on registration hunt reports provides some of the limited information on population composition in the unit. In 1999 a total of 292 hunters reported observing a total of 1770 moose in Unit 1B, including 561 bulls, 866 cows, and 343 calves, for a bull to cow ratio of 65:100, and a calf to cow ratio of 40:100. In 2000, 269 hunters reported observing a total of 1884 moose, including 612 bulls, 903 cows, and 369 calves, for a bull to cow ratio of 68:100, and a calf to cow ratio of 41:100.

### *Distribution and Movements*

Moose have been observed crossing Dry Straits between Farm Island on the Stikine River delta and Mitkof Island. At low tide this strait can be crossed easily and moose are reported to move in both directions. Radio telemetry of Stikine moose found no evidence of extensive seasonal migration (Craighead et. al., 1984). Rutting surveys in 1995 and 1996 identified Dry Wash, Andrew Island, and Barnes Lake as important rutting areas on the Stikine River. Moose appear to be well distributed in the Alaska portion of the Stikine River valley and Thomas and Farragut bays. Moose seem to be absent from the Bradfield Canal area although several river valleys appear to have suitable habitat.

## **MORTALITY**

### *Harvest*

#### Season and Bag Limit

#### Resident and nonresident hunters

Unit 1B

Sept. 15–Oct. 15  
(General hunt only  
except in Stikine Drainage)

1 bull with spike-fork antlers  
or 50-inch antlers or antlers  
with 3 or more brow  
tines on one side by  
registration permit only

Game Board Actions and Emergency Orders. No Board of Game actions were taken or emergency orders issued regarding Unit 1B moose during the report period.

Hunter Harvest. In 1999 the unit-wide harvest was 40 moose and in 2000 it was 20. In 1999, 185 hunters harvested 20 moose on the Stikine portion of Unit 1B. In 2000, 165 hunters harvested 14 moose in the Stikine River drainage (Table 2). In 1999, 107 hunters (Table 3) harvested 20 moose at Thomas Bay, including 3 from Farragut Bay. In 2000, 104 hunters harvested 6 moose at Thomas Bay, including 2 from Farragut Bay.

Hunter Residency and Success. In 1999, 90% and of all successful hunters on the Stikine River were Petersburg or Wrangell residents (Table 4), and in 2000 it was 93%. The overall success

rate for Stikine River moose hunters was 11% in 1999 and 8% 2000.

Petersburg residents continued to dominate the Thomas Bay and Farragut Bay moose hunts (Table 5). In 1999, 95% and in 2000, 100% of all successful hunters at Thomas Bay and Farragut Bay were Petersburg residents. The overall success rate for Thomas Bay and Farragut Bay moose hunters was 19% in 1999 and 6% in 2000.

Harvest Chronology. Harvest chronology for Unit 1B moose has varied. In general, most bulls are killed during the first half of the season and the success rate declines throughout the season (Table 6). In 1999, the largest percentage of the annual harvest at Thomas Bay occurred during the third and first weeks of the season, respectively. The largest percentage of the annual harvest on the Stikine occurred during the first and last week of the season, respectively.

In 2000, the largest percentage of the annual harvest at Thomas Bay occurred during the first and second weeks of the season, respectively. The largest percentage of the annual harvest on the Stikine occurred during the third and fourth weeks of the season, respectively. Most hunters are in the field early in the season, and except for weekends, effort tends to drop off as the season progresses. Inclement weather does not appear to slow hunting effort early in the season.

Guided Hunter Harvest. No guided hunts are currently offered in the unit.

Transport Methods. During the report period all successful hunters reported using boats to access the areas they hunted in the unit (Table 7). Motorized land vehicles are prohibited for moose hunting in the Thomas Bay hunt and the Stikine Wilderness. Motorized land vehicles may be used in Thomas Bay for any purpose except moose hunting.

### *Other Mortality*

Wolves, black bears, and brown bears are moose calf predators and wolves and brown bears take adult moose. The extent of predation on these moose herds is unknown, but it appears that in some years few calves are recruited into the Stikine herd. Hunters reported increased signs of wolf activity at Thomas Bay during the 1999 season.

## **HABITAT**

### *Assessment*

Moose populations at Thomas Bay responded favorably to the initial increase in available browse resulting from extensive clearcut logging between 1958 and 1975. Since that time the dense, closed-canopy forests resulting from natural regeneration of second growth stands has reduced available understory browse vegetation.

In 1991 the U.S. Forest Service (USFS) cleared a 100-acre plot along the Patterson River to investigate the feasibility of improve moose habitat. Re-growth has been browsed heavily during the summer leaving little winter forage in this area.

Stikine River moose range lies mostly within the USFS Stikine/LeConte Wilderness area and the Stikine drainage. Moose habitat in this area, identified by Craighead et. al. (1984), is designated wilderness and cannot be artificially manipulated for improvement. Nineteen transects were

surveyed in 1984 to determine the condition and availability of moose winter browse in the Stikine River corridor (Craighead et. al. 1984). The transects were revisited in June 1991 and in June 1997. Preferred browse species were identified as willow (*Salix* spp.) and red osier dogwood (*Cornus stolonifera*). The total percent of available browse that was heavily utilized in June 1997 included 62.2% *Salix* spp. and 63.9% *Cornus* spp. (Elze and Posner 1997). In 1991 the percentage in the heavy use category was 15.8% for *Salix* spp. and 13.8% for *Cornus* (Stoneman 1992). In 1997 the majority of plants recorded were in the heavily used category compared to 1991 when most plants were in the zero to moderately use categories (Stoneman 1992).

No habitat assessment surveys were conducted during this report period.

### *Enhancement*

It is estimated that pre-commercial thinning of second growth stands will extend the habitat value of clearcuts for an estimated 20–30 years. In March 1997, ADF&G implemented a plan to enhance moose habitat on state land at Thomas Bay. Phase 1 of the plan called for reopening 10 miles of logging roads that were impassable due to dense vegetative growth and downed trees. Road clearing operations were completed in June 1998. Phase two of the plan called for treating 380 acres of dense second growth primarily by pre-commercial thinning and partial strip clearing. The thinning of 4 second-growth units totaling 380 acres was completed in October 1998.

### **NONREGULATORY MANAGEMENT PROBLEMS/NEEDS**

Thomas Bay moose populations responded favorably to the initial increase in available browse resulting from extensive clearcut logging between 1958 and 1975, but the dense, closed canopy forests caused by the natural regeneration of second-growth stands is decreasing the amount of available browse. As a result the quality of the habitat has been declining. The loss of habitat and the resulting decline in available food is of great concern to biologists and hunters. Left untreated, the young, second growth conifer stands will shade and eventually eliminate understory browse vegetation, further reducing moose-carrying capacity. The only way to prevent further decline of moose habitat will be to institute habitat manipulation procedures.

For genetic or environmental reasons moose in the unit do not develop antler configurations that are predictable relative to age, therefore, some modification of the existing antler restrictions may be justified. Moose in the unit rarely achieve 50-inch antler spreads, and in Thomas Bay in particular the population appears to contain a surplus of illegal bulls in excess of that need to ensure timely breeding of cows.

### **CONCLUSIONS AND RECOMMENDATIONS**

None of the Stikine management objectives were met in 1999 and 2000. Hunter-days of effort increased from the previous report period, but it remained below the management objectives during this report period. Hunter success was only slightly below the management objective in 1999 but fell well short of the objective in 2000. We believe the Stikine moose population was increasing from 1994 until 1999, but it now appears to be decreasing.

In Thomas Bay the moose harvest equaled the management objective in 1999 but fell well below the objective in 2000. The number of hunters declined from the previous report period and did not meet the management objectives in either 1999 or 2000. Although hunter-days of effort also declined from the previous report period, they met or exceeded the objective in both 1999 and 2000. Hunter success exceeded the management objective in 1999 but was well below the objective in 2000. The Thomas Bay moose population currently appears stable at a high level.

We recommend Units 1B and 3, and the extreme southern portion of Unit 1C continue to be managed by a common registration permit hunt. We also recommend that for the time being, the season dates remain from September 15 through October 15 with a bag limit of one bull with spike/fork or 50" antlers or at least 3 brow tines on one antler. Because moose found in Units 1B and 3 do not display antler characteristics that are predictable relative to age, some modification of the existing antler restrictions or lengthening of the season may be justified in the future.

### **LITERATURE CITED**

- CRAIGHEAD, F. L., E. L. YOUNG, AND R. BOERTJE. 1984. Stikine River moose study, wildlife evaluation of Stikine-Iskut dams. Final Report. Alaska Dept. of Fish and Game. Juneau. 72pp.
- ELZE, K. K., AND S. POSNER. 1997. Moose Browse Transects in the Stikine River Corridor. Tongass National Forest Stikine Area-Wrangell Ranger District.
- STONEMAN, J. 1992. Moose Winter Browse Transects on the Stikine River Corridor. Tongass National Forest Stikine Area-Wrangell Ranger District.

#### **PREPARED BY:**

Richard E. Lowell  
Wildlife Biologist II

#### **SUBMITTED BY:**

Bruce Dinneford  
Regional Management Coordinator

Please cite any information taken from this section, and reference as:

Lowell R. E. 2002. Unit 1B moose management report. Pages 7–19 in C. Healy, editor. Moose management report of survey and inventory activities 1 July 1999–30 June 2001. Alaska Department of Fish and Game. Project 1.0. Juneau, Alaska.

Table 1 Unit 1B Stikine area aerial moose surveys, regulatory years 1989 through 2000

Yr month/day	Adults	Calves	(%)	Unidentified	Total moose	Moose/hour
<u>1989</u>						
07/27	45	14	(23)	2	61	31
03/02	27	2	(7)	0	29	16
03/08	61	5	(8)	0	66	36
<u>1990</u>						
07/20	23	3	(11)	2	28	22
07/25	10	1	(9)	0	11	10
07/27	30	0	(0)	0	30	12
08/11	8	3	(23)	2	13	6
08/18	26	3	(10)	0	29	12
12/15 <sup>a</sup>	70	12	(15)	0	82	50
02/20 <sup>a</sup>	38	6	(14)	0	44	34
03/05 <sup>a</sup>	89	5	(5)	0	94	32
05/19 <sup>b</sup>	0	0	(0)	2	2	2
<u>1991</u>						
03/03 <sup>c</sup>	6	0	(0)	0	6	18
<u>1992</u>						
12/19 <sup>a</sup>	59	12	(16)	2	73	21
03/25 <sup>a</sup>	73	7	(9)	0	80	34
<u>1993</u>						
02/10 <sup>a,d</sup>	46	4	(8)	0	50	39
<u>1994</u>						
03/02	34	0	(0)	0	34	
04/08	30	1	(3)	0	31	
<u>1995</u>						
02/25	76	17	(18)	0	93	26
<u>1996</u>						
3/08	122	35	(22)	0	157	47
<u>1997</u>						
	No data	-	-	-	-	-
<u>1998</u>						
2/24	103	32	(24)	0	135	44
<u>1999</u>						
	No data					
<u>2000</u>						
2/17 <sup>e</sup>	2	2	(50)	0	4	4
3/22	9	2	(18)	0	11	8
6/11	11	7	(39)	0	18	9

<sup>a</sup> Helicopter survey.<sup>b</sup> River stage high, full leaf out in lower river, moose not visible.<sup>c</sup> Helicopter survey aborted due to weather.<sup>d</sup> Farm Island to 15 Mile Island only, then abandoned due to weather.<sup>e</sup> Poor survey conditions on lower river, US/Canada boarder to Kakwan Point only



Table 2 Unit 1B (Stikine) moose harvest, regulatory years 1989 through 2000

Year	Hunter harvest reported					
	M	(%)	F	(%)	Unk.	Total
1989	38	(100)	0	(0)	0	38
1990	36	(97)	1	(3)	0	37
1991	24	(96)	1	(4)	0	25
1992	18	(95)	1	(5)	0	19
1993	14	(100)	0	(0)	0	14
1994 <sup>a</sup>	3	State season closed by emergency order				3
1995	5	(100)	0	(0)	0	5
1996	18	(100)	0	(0)	0	18
1997	17	(100)	0	(0)	0	17
1998 <sup>b</sup>	24	(100)	0	(0)	0	24
1999	20	(100)	0	(0)	0	20
2000	14	(100)	0	(0)	0	14

<sup>a</sup> Taken under federal permits; state season closed by emergency order.

<sup>b</sup> Includes 1 DLP and 2 Illegal kills.

Table 3 Unit 1B (Thomas and Farragut bays) moose harvest, regulatory years 1989 through 2000

Year	Hunter harvest reported						
	M	(%)	F	(%)	Illegal	Unk.	Total
1989	20	(100)	0	(0)	0	0	20
1990	25	(100)	0	(0)	0	0	25
1991	15	(100)	0	(0)	0	0	15
1992	27	(96)	1	(4)	1	0	28
1993	27	(100)	0	(0)	0	0	27
1994	11	(100)	0	(0)	0	0	11
1995 <sup>a</sup>	15	(100)	0	(0)	0	0	15
1996 <sup>b</sup>	24	(94)	1	(6)	0	0	25
1997	18	(100)	0	(0)	0	0	18
1998	24	(100)	0	(0)	1	0	24
1999	20	(100)	0	(0)	2	0	20
2000	6	(100)	0	(0)	0	0	6

<sup>a</sup> Includes one moose harvested in Port Houghton.

<sup>b</sup> Includes DLP.

Table 4 Unit 1B (Stikine) moose hunter residency and success, regulatory years 1989 through 2000

Year	<u>Successful</u>						<u>Unsuccessful</u>						Total hunters
	Local <sup>a</sup> resident	Nonlocal resident	Non- resident	Unk.	Total	(%)	Local <sup>a</sup> resident	Nonlocal resident	Non- resident	Unk.	Total	(%)	
1989 <sup>b</sup>	23	15	0	0	38	(13)	170	106	7	0	283	(87)	321
1990 <sup>b</sup>	36	0	1	0	37	(12)	215	27	1	0	243	(88)	280
1991 <sup>b</sup>	23	1	1	0	25	(12)	146	34	5	5	190	(88)	215
1992	16	2	0	1	19	(8)	183	24	3	1	211	(92)	229
1993	14	0	0	0	14	(10)	121	6	0	0	127	(90)	141
1994 <sup>c</sup>	State season closed by emergency order				3								
1995	5	0	0	0	5	(4)	91	6	0	0	97	(96)	102
1996	18	0	0	0	18	(14)	105	7	0	0	112	(86)	130
1997	16	1	0	0	17	(12)	117	8	0	0	125	(88)	142
1998	23	1	0	0	24	(13)	154	9	0	0	163	(87)	187
1999	18	2	0	0	20	(11)	147	18	0	0	165	(89)	185
2000	13	1	0	0	14	(8)	137	12	2	0	151	(92)	165

<sup>a</sup> Residents of Petersburg and Wrangell.

<sup>b</sup> Unsuccessful hunter data expanded to correct for non-reporting hunters.

<sup>c</sup> Three moose taken under federal permits.

Table 5 Unit 1B (Thomas and Farragut bays) moose hunter residency and success, regulatory years 1989 through 2000

Year	<u>Successful</u>					<u>Unsuccessful</u>					
	Local <sup>a</sup> resident	Nonlocal resident	Non- resident	Total	(%)	Local <sup>a</sup> resident	Nonlocal resident	Non- resident	Total	(%)	Total hunters
1989 <sup>b</sup>	18	2	0	20	(14)	119	7	0	126	(86)	146
1990 <sup>b</sup>	23	2	0	25	(15)	126	10	1	137	(85)	162
1991 <sup>b</sup>	14	1	0	15	(12)	96	12	0	108	(88)	123
1992 <sup>b</sup>	25	2	1	28	(25)	77	6	0	83	(75)	111
1993 <sup>b</sup>	26	1	0	27	(20)	103	4	1	108	(80)	135
1994	11	0	0	11	(9)	108	9	0	117	(91)	128
1995	14	1	0	15	(11)	108	8	0	116	(89)	131
1996	23	2	0	25	(16)	107	15	1	123	(84)	148
1997	18	0	0	18	(12)	116	11	1	128	(88)	146
1998	23	1	0	24	(19)	91	12	0	103	(81)	127
1999 <sup>c</sup>	19	1	0	20	(19)	79	8	0	87	(81)	107
2000	6	0	0	6	(6)	91	5	2	98	(94)	104

<sup>a</sup> Residents of Petersburg and Wrangell.

<sup>b</sup> Includes illegal kill.

<sup>c</sup> Includes two illegal kills.

Table 6 Unit 1B moose harvest chronology, regulatory years 1993 through 2000

Area	Year	15–21 Sept.	22–28 Sept.	29 Sept.–5 Oct.	6–15 Oct.
Thomas Bay	1993	0	0	19	8
	1994	0	0	9	2
	1995	8	3	2	2
	1996	11	5	3	6
	1997	5	4	6	3
	1998	9	6	5	4
	1999	5	4	7	4
	2000	3	2	1	0
Stikine	1993	5	1	4	4
	1994	State season closed by emergency order			
	1995	3	1	0	1
	1996	6	6	2	4
	1997	7	3	3	4
	1998	12	5	3	4
	1999	6	3	4	7
	2000	3	1	5	5

Table 7 Unit 1B successful moose hunter transport methods by area, regulatory years 1990 through 2000

Area	Year	Airplane	Boat	Highway vehicle	3- or 4-wheeler	Horse	Unknown	Total
Thomas Bay	1990	1	22	0	2	0	0	25
	1991	1	14	0	0	0	0	15
	1992	0	27	0	0	1	0	28
	1993	4	23	0	0	0	0	27
	1994	1	9	0	0	0	1	11
	1995	3	11	1	0	0	0	15
	1996	0	25	0	0	0	0	25
	1997	0	18	0	0	0	0	18
	1998	2	22	0	0	0	0	24
	1999	1	18	0	0	0	1	20
	2000	0	6	0	0	0	0	6
Stikine	1993	1	13	0	0	0	0	14
	1994		state season closed by EO					
	1995	0	5	0	0	0	0	5
	1996	2	16	0	0	0	0	18
	1997	0	17	0	0	0	0	17
	1998	2	22	0	0	0	0	24
	1999	0	20	0	0	0	0	20
	2000	0	14	0	0	0	0	14

**SPECIES**  
**MANAGEMENT REPORT**

**Alaska Department of Fish and Game**  
**Division of Wildlife Conservation**  
(907) 465-4190 PO BOX 25526  
JUNEAU, AK 99802-5526

**MOOSE MANAGEMENT REPORT**

From: 1 July 1999  
To: 30 June 2001

**LOCATION**

**GAME MANAGEMENT UNIT:** 1C (7,600 mi<sup>2</sup>)  
**GEOGRAPHICAL DESCRIPTION:** That portion of the Southeast Alaska mainland from Cape Fanshaw to the latitude of Eldred Rock.

**BACKGROUND**

Moose are relative newcomers to many parts of Southeast Alaska, with many of the populations becoming established in the early-to-mid 1900s. Some areas, such as the Gustavus Forelands, did not have moose present until the 1960s. It is likely that coastal mountains inhibited the movement of moose into these areas. Once moose discovered these unexploited areas, the presence of high quality habitat led to rapid expansions of new populations. In three of the four moose management areas in this subunit, moose moved in naturally, while in one area they were introduced.

*Taku River:* The arrival date of moose in the Taku River drainage is not documented, but Swarth (1922) states that a moose was killed at the mouth of the Stikine River "some years" prior to 1919. If moose appeared at the same time on the Taku (which is a reasonable assumption given the proximal location and similar and ecological makeup), then presumably they first occurred in the lower part of the river near the turn of the century. In 1960, ADF&G biologists observed 38 moose along the Taku River, and 27 moose were harvested there that year.

Moose occur on the Whiting and Speel rivers south of the Taku. These animals may have originated from the Taku herd, from immigration into the Whiting drainage from the Canadian mainland, or from some other source. In recent years moose and their sign have been seen regularly in the Port Houghton area. These moose probably moved across the Fanshaw Peninsula from the Farragaut Bay/Thomas Bay population to the south.

*Berners Bay:* This moose population, one of the most popular herds to hunt in the Juneau area, did not occur naturally. Fifteen calves from the Anchorage area were released in Berners Bay in 1958, and a supplemental release of 6 more calves occurred in 1960. In June 1960, 3 cows with a single calf each were observed, indicating that cows had bred at about 16 months of age. The first limited open season was held in 1963, when 4 bulls were killed. Since that time, the annual harvest has ranged from 5 to 23 animals. Managing the Berners Bay moose herd has been a challenging task for ADF&G. The geography of the area allows for little to no immigration or emigration, resulting in a closed population with limited habitat. Because of this, ADF&G has used a variety of hunts, changing the harvest from bulls only to bulls and cows, in an attempt to

balance the herd's sex ratio and limit the population size within the carrying capacity of the habitat. The use of a habitat capability model as well as moose browse surveys in the early 1980's helped shape the present management strategy of keeping the post-hunt population at no more than 90 moose observed during aerial surveys to assure the herd does not exceed a level the habitat can support.

*Chilkat Range:* Moose were first documented in western Unit 1C in 1962 on the Bartlett River. In 1963 moose were observed in the Chilkat Mountain range; these animals probably originated from the Chilkat Valley population near Haines. In 1965 moose were sighted for the first time along the Endicott River and St. James Bay areas. Moose probably followed the Endicott River to Adams Inlet shortly thereafter, because they were common in Adams Inlet by the 1970's. Because of thick timber stands along the Endicott and the difficulty of gathering reliable aerial survey data, our understanding of the Chilkat Range moose population is mostly limited to hunter reports and hunter harvest.

*Gustavus Forelands:* The first sightings of moose in the Gustavus area occurred in 1968. It is likely moose migrated to this area via the Excursion River drainage. Twenty years passed before the first moose was harvested at Gustavus in 1988, evidence that moose took a while to populate this area. Since then, the population has expanded rapidly to become the largest in the unit, accounting for the highest harvest. The number of animals in this herd has reached a level that is not sustainable, given limited winter range. Because of this concern ADF&G began a moose browse study on the forelands in 1999, and used resultant data to convince the Board of Game in 2000 to adopt a drawing permit hunt for cow moose.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

In 1998 we revised Unit 1C moose management objectives based on recent hunt and survey information. We separated the Gustavus Forelands herd from moose in the remainder of the Chilkat Range because of its discrete nature. Below is a list of the newly drafted management objectives:

1. Taku drainage: Maintain a post-hunting population of 100 moose, an annual harvest of 10, and a hunter success rate of 20%;
2. Berners Bay: Maintain a post-hunting population of 90 moose, an annual harvest of 18, and a hunter success rate of 90%;
3. Chilkat Range: Maintain a post-hunting population of 200 moose, an annual harvest of 20, and a hunter success rate of 22%;
4. Gustavus Forelands: Maintain a population of 250, an annual harvest of 40, and a hunter success rate of 33%.

## **METHODS**

Aerial surveys were conducted throughout most of the subunit during the report period. Survey flights were accomplished both years at Berners Bay and Gustavus Forelands, and in the Taku

River drainage in 2000 only. Only the upper section of the Endicott River within the Chilkat Range was surveyed, although we did conduct an aerial survey of Adams Inlet in Glacier Bay National Park (GBNP), where we believe some Endicott River moose over-winter. One registration permit hunt (RM046) and 2 drawing permit hunts (DM041 and 042) were used to manage moose hunting effort in Unit 1C. Berners Bay moose were managed under one bull-only hunt and a separate antlerless hunt. The remainder of Unit 1C (excluding that area south of Pt. Hobart) was managed under the registration permit hunt. Since 1995, the area south of Pt. Hobart has been included in the antler-restriction hunt conducted in Units 1B and 3 (RM038), and all moose taken there were included in the management report covering those areas. A condition of all drawing and registration hunts required successful hunters to bring in incisors from harvested moose for aging. Other data collected from the permit hunt reports included the hunt length, hunter residency, hunt location, commercial services used, and transport means (for all hunters), and date of kill (for successful hunters).

## **RESULTS AND DISCUSSION**

### **POPULATION STATUS AND TREND**

#### *Population Size*

*Taku:* Little information is available regarding the number of moose in the Taku River drainage. A winter 2000 aerial survey enumerated 37 moose (Table 1), but the fall 2000 harvest of 23 moose was the highest since 26 moose were killed in 1985. We have never counted many moose along the Alaska portion of the Taku, suggesting that the main wintering area for these moose is in Canada. In spite of our low survey numbers, hunters have had reasonable success hunting moose on the Taku. It is likely that most moose harvested along the Taku spend a majority of the year (including winter) in Canada, and animals moving downriver from Canada during the hunting season supplement the local population. Some of the Alaska harvest undoubtedly comes from across the border, but we cannot quantify this illegal take. Aerial surveys conducted by Canadian biologists along the lower Tulsequah River in Canada during February 2000 enumerated 213 moose, with a bull to cow ratio of 98:100. If we consider these animals as part of the same population that are hunted along the Alaska portion of the Taku River, then our present harvest objectives for the Taku appear sustainable. Recently there has been no harvest on the lower Taku in Canada (Karen Diemert, pers. comm.). South of the Taku River on the Alaska mainland, a few moose have been harvested in the Port Houghton area over the years. These moose are an extension of the population using Thomas and Farragut bays south of the Fanshaw Peninsula, and are distinct from other Unit 1C moose populations. Most of the effort directed at Port Houghton moose comes from Petersburg.

*Berners Bay:* The Berners Bay moose population appears to be near the estimated carrying capacity, between 100 and 150 animals, and is being maintained with selective harvests to adjust the bull to cow ratio (Table 1). Berners Bay surveys in 1999 and 2000 enumerated 108 and 79 moose, respectively. The 1999 count was the highest in recent history, the result more of ideal survey conditions rather than an increase in the moose population. The 2000 count of 79 moose was more typical of the previous 10-year period (Table 1). Since 1993 we have issued up to 20



drawing permits annually for Berners Bay, with the number and sex of moose to be taken determined by aerial survey results.

*Chilkat Range:* The status of the Chilkat Range moose population is unknown, as surveys have not been conducted due to limited snow cover and dense forest canopy. We did conduct a survey of the upper Endicott River and Adams Inlet in 2000 (Table 1) and counted 125 moose, but nearly all of these animals were in Glacier Bay National Park (GBNP). Moose in the Adams Inlet area of GBNP likely cross Endicott Gap and move to the Endicott River during the spring and summer, supplementing the herd along the west side of Lynn Canal. How many of these animals are available to hunters on non-park lands is unknown. Based on harvest records and anecdotal information from hunters, the number of moose in the Chilkat Range appears to be stable.

*Gustavus Forelands:* Based on winter aerial surveys in 1999 and 2000, the Gustavus Forelands moose population is either stable or increasing (Table 1). We believe an influx of moose from GBNP is supporting the increasing harvest on state land here. Both the total number of moose and the number of calves in the herd indicate a rapidly expanding population. Improving habitat conditions due to isostatic rebound on lands where glaciers have recently retreated have stimulated moose productivity.

#### *Population Composition*

Although we conducted thorough aerial surveys of 3 of the 4 Unit 1C moose populations during the report period, we were only able to get reliable composition data in Berners Bay in 1999. The other surveys provided us with overall moose numbers and a breakdown of adults and calves, but we could not quantify bulls due to the late timing of the surveys and advanced antler drop (Table 1). This is often the case in Southeast Alaska, where adequate snow conditions for observing moose do not usually occur until mid-winter. We collected lower jaws from each harvested moose from successful hunters, providing us with the age structure of the harvest (Tables 2 & 3).

*Taku:* During a February 2001 aerial survey we counted 37 moose on the Taku River drainage. We were unable to quantify bulls due to antler drop, but did enumerate 5 calves and 7 cows (Table 1). This count is comparable to previous counts dating back to the early 1980's.

The mean age of harvested moose was 2.0 years during the report period, compared to 2.5 years for 1997 and 1998. This continuing harvest of young bulls indicates a healthy population with good recruitment.

*Berners Bay:* A November 1999 aerial survey allowed us to gather fairly reliable composition data. We calculated a bull to cow ratio of 17 bulls to 100 cows, and a calf to cow ratio of 16 calves to 100 cows. The ratio of bulls to cows is the lowest in the last 10 years, but may be partly due to some of the bulls having shed their antlers; 3 bulls were seen during the survey with only one antler. The percent calves in the herd was the second lowest since 1990.

Mean age at harvest of Berners Bay moose was 4.2 years for males and 2.8 years for females, during the report period. This compares to a mean age of 2.9 years for males and 3.7 years for females during the previous report period.

*Chilkat Range:* A February 2001 aerial survey did not allow us to differentiate bull and cow moose. Because of strong winds and turbulent flying conditions, we were unable to spend the time necessary to positively quantify calves.

The mean age of harvested moose was 2.9 years, similar to the mean of 3.1 years from the previous report period.

*Gustavus Forelands:* We conducted only one aerial survey at Gustavus during the report period. This survey was flown in February 2001, preventing us from differentiating bulls and cows. We were able to differentiate calves, and calculated the percent calves in the herd at 22%, an indication that this moose herd is still expanding.

The mean age at harvest was 2.2 years compared to 1.7 during the previous report period. The harvest of young bulls is a further reflection of a growing herd.

#### *Distribution and Movements*

### **MORTALITY**

#### *Harvest*

<u>Season and bag limits</u>	<u>Resident and nonresident hunters</u>
Unit 1(C), Berners Bay drainages	Sept. 15–Oct. 15 (General hunt only)
1 moose by drawing permit only; up to 20 permits may be issued	
Unit 1(C), that portion south of Point Hobart, including all Port Houghton drainages	Sept. 15–Oct. 15 (General hunt only)
1 bull with spike-fork or 50-inch antlers or antlers with 3 or more brow tines on one side by registration permit only	
Remainder of Unit 1(C)	Sept. 15–Oct. 15 (General hunt only)
1 bull by registration permit only	

Game Board Actions and Emergency Orders. At the fall 2000 Board of Game meeting, the Board adopted a department proposal to increase the number of Berners Bay drawing permits from 20 to 30. The board also adopted a proposal to allow ADF&G to implement a drawing hunt for up to 10 cow moose on the Gustavus Forelands beginning in fall of 2001. Emergency orders

(EOs) were issued to close the season early in the Gustavus area during both years of the report period. In both years the bull guideline harvest level (40 in 1999 and 45 in 2000) was met during the first week of October.

Hunter Harvest. The Berners Bay drawing permit hunt was managed for a harvest of 15 moose from 1993–95. In 1996 the take increased to 17 as a result of a Fish and Wildlife undercover operation (Table 4). The permit allocation remained at 15 (8 bulls and 7 cows) for both years of the previous report period, and was increased to 18 permits in 1999 and 20 permits in 2000. Hunter success was 100 percent in 1999 and 88 percent in 2000. In 2000, hunters with bull permits had a higher success rate (100%) than those with cow permits (83%), although the reverse was true the following year with 80% successful bull hunters and 100% successful cow hunters. All bull permittees hunted in both years, compared to 75% of the antlerless moose permit holders in 1999 and 80% in 2000.

The balance of Unit 1C was managed under registration permit, with biologists keeping the kill within a guideline harvest level rather than a strict quota. The Chilkat Range harvest ranged from 6 to 28 from 1990–98 (Table 5), with the 1998 harvest of 28 the highest ever recorded. The 1999 harvest was 11, and in 2000 the harvest was 14. In both years considerable rainfall during the hunting season caused moose to move to higher, forested ground, making them difficult for hunters to locate.

The Gustavus Forelands harvest has climbed dramatically, reaching 48 animals in 1998 before the season was closed by EO. In both 1999 and 2000 the season was again closed by EO after meeting the guideline harvest level.

The Taku harvest ranged between 14 and 20 from 1990–98. The 1997 harvest of 6 was the lowest in the past 10 years, due to few moose being seen rather than a decline in hunting effort (Table 4). The 1999 harvest climbed to 17 and went even higher in 2000 with 23 moose taken. This is the highest harvest recorded in the Taku drainage since 1985 when 26 moose were harvested.

Unit 1C moose harvest outside of Berners Bay continues to increase, largely due to the influence of Chilkat Range and Gustavus Forelands hunts. These areas accounted for 44 of 65 moose harvested in Unit 1C in 1997, and 76 of 105 moose in 1998 (Table 5). During the same period, harvest in the Taku area has remained at or below historic levels (Table 5). Coupled with the Berners Bay harvest, the total Unit 1C moose harvest is at a historic high.

Permit Hunts. Over 1,600 applications were submitted for the Berners Bay permit drawing hunt during 1999, and in 2000 1,700 were submitted. This is a large increase over the previous report period when an average of 1,246 applications were submitted for these permits. The proximity of Berners Bay to Juneau and the high hunter success rate explains the popularity of this hunt. In 1999, 94% of Berners Bay hunters were successful, and in 2000 100% of the permittees who hunted got a moose.

Since the registration permit format was implemented for Unit 1C (except Berners Bay), more than 200 permits have been issued annually (Table 4). In 1999, a total of 476 permits were issued, followed by 455 in 2000. The increase in interest stems mainly from the popularity of the

Gustavus hunt; roughly 46% of hunting permittees went to Gustavus. As in most hunts, not all the permittees actually participated in a hunt. In 1999 only 301 of the 476 permittees actually hunted, and 296 of 455 permittees hunted in 2000.

Hunter Residency and Success. Most moose harvested in Unit 1C continue to be taken by residents of the subunit (Table 6). During the report period, residents of the subunit took 165 of 191 harvested moose, 8 were taken by other Southeast residents, 12 were taken by Alaska residents from outside of Southeast Alaska, and 6 were taken by nonresidents. Southeast moose hunting areas are not readily accessible via highway vehicles, and residents from elsewhere in Alaska have better moose hunting opportunities closer to home. Nonresidents eager to take moose focus on areas with larger moose populations and a better chance of getting a trophy animal. Twenty-six percent of all Unit 1C hunters were successful in 1999, and in 2000 the success rate climbed to 35%. Hunters at Gustavus and the Taku River shared equal success (Table 5), while Chilkat Range hunters did not fare as well.

Harvest Chronology. Similar to recent years, the 1999 and 2000 moose harvest was heavily weighted toward the early part of the season. This is partly because nearly all hunters participate on opening day, and hunt less as the season goes on. Also, the Gustavus hunt, which attracts the majority of hunters in the subunit, has been closed by EO in early October during each of the past two years. Generally about 30% of the Gustavus Forelands harvest takes place in the first 3–4 days of the hunt.

Transport Methods. The type of transport used by successful hunters varies by hunt area, and difficulties with the logistics of access would be expected.

*Taku:* In the Taku hunt 100% of hunters used boats for access in 1999, and 91% used boats in 2000 (Table 7). Most hunters used boats equipped with jet units to reach this area, and many hunters have access to cabins in the upper part of the drainage.

*Berners Bay:* In Berners Bay all successful hunters used boats for access (Table 7). Access in this area is essentially all by airboat.

*Chilkat Range:* Hunters in the Chilkat Range used both airplanes and boats for access. In 1999, 73% of the successful hunters flew into their hunt area, while the remaining 27% used boats for access. In 2000, airplane and boat access was evenly divided (Table 7). Generally, most airplane access to this area is in the upper Endicott River, while most boat access takes place at St. James Bay.

*Gustavus Forelands:* Successful Gustavus Forelands hunters use a variety of access methods. During the report period an average of 12% of the hunters used airplanes for access, 18% used boats, 2% used ATV's, 38% used highway vehicles, and 30% walked to their hunting area. The high percentage of hunters who walk only are residents of Gustavus.

Other Mortality. Winters were mild during both report years, so known natural mortality was limited to a few wolf kills on the Gustavus Forelands. Other mortality included 3 cow moose that were taken illegally during the 2000 Gustavus hunt, and a cow and calf moose that were killed in wolf snares there.

Habitat. A Gustavus browse monitoring project initiated in 1999 was maintained through this report period and will continue. The project monitors willow utilization by moose on winter range. Preliminary data analysis suggests that the moose population is higher than the range can support. Data generated by this study was used by the Board of Game in its decision to adopt a proposal to allow a cow moose hunt at Gustavus.

## **CONCLUSIONS AND RECOMMENDATIONS**

*Taku:* All Taku River management objectives were surpassed during both years of the report period. In 1999 a total of 17 moose were harvested with a hunter success rate of 25%. The 2000 harvest was 23 moose with a hunter success rate of 33%. Both years are well above the management objectives of a 10-moose harvest and a hunter success of 20%. Based on aerial surveys we did not meet the 100-moose population objective. However, we believe that most Taku moose spend the winter in Canada, thereby making this management objective difficult to measure.

*Berners Bay:* We did not meet management objectives for the number of moose harvested (18) during either year of the report period, when 15 moose were killed annually. However, we did meet the objective for 90% hunter success each year, with 94% and 100% of the hunters harvesting moose in 1999 and 2000, respectively. We met the population objective of 90 post-hunt animals each year, with the 108 moose surveyed in 1999 and 79 moose in 2000 indicating there were well over 90 moose present.

*Chilkat Range:* We did not meet any management objectives for the Chilkat Range during the report period. Harvest objectives call for an annual kill of 20 moose and a hunter success rate of 22%. The 1999 harvest was only 11 moose with a success rate of 11%, while in 2000 the harvest was 14 moose with a success rate of 13%. The mean annual harvest during this report period was the lowest since 1993–1994, and the hunter success rate was the lowest of the past 5 report periods. Reasons for this decline in harvest and success are not known because we have no population information in this area. Although we have a harvest objective of 200 moose in this area, we are unable to conduct reliable surveys to quantify the population.

*Gustavus Forelands:* We were able to meet the harvest management objectives in both years of the report period, and only by issuing emergency orders to close the season were we able to prevent higher harvests. In 1999 the harvest was 42 moose, and 47 moose were taken in 2000, both surpassing the objective of 40 moose. The objective for a 33% hunter success rate was met in 2000 when 37% of all hunters killed a moose, but was not met in 1999 when only 29% of hunters were successful. The population objective of 250 moose was met, given that we saw 207 animals on our survey and estimated there were 250–300 present.

Rising effort and harvest on the Gustavus Forelands increases the importance of acquiring consistent aerial survey data for moose in that portion of the subunit. Acquiring additional browse utilization information as well as herd composition data are priorities here. Implementation of a cow hunt during the next report period to lower the productivity of that herd is advised.

We believe that a continuation of the permit registration system should accommodate current population objectives throughout Unit 1C, and we will continue to collect jaws from harvested moose for age analysis. Areas supporting the most critical winter browse should be analyzed, even cursorily, to estimate the status of moose populations in relation to carrying capacity. This is particularly true in the Gustavus area where habitat information complements our aerial survey information to help us anticipate management decisions.

## **LITERATURE CITED**

**SWARTH, H.S.** 1922. Birds and Mammals of the Stikine River Region of Northern British Columbia and Southeastern Alaska. Vol. 24 No. 2. Univ. of California.

Prepared by:

Neil L. Barten  
Wildlife Biologist III

Submitted by:

Bruce Dinneford  
Regional Management Coordinator

Please cite any information taken from this section, and reference as:

Barten, N. L. 2002. Unit 1C moose management report. Pages 20–41 *in* C. Healy, editor. Moose management report of survey and inventory activities 1 July 1999–30 June 2001. Alaska Department of Fish and Game. Proj. 1.0. Juneau, Alaska.

Table 1 Unit 1C aerial moose survey data, regulatory years 1990 through 2000

Year	Bulls	Cows	Calves	Unknown	Total moose	Count time (hrs)	Bulls per 100F	Calves per 100F	Calves % in herd	Moose per hour
<u>Berners Bay 1990–2000</u>										
1990	14	53	18	0	85	2.6	26	34	21	33
1991	---	---	11	50	61	1.2	---	---	18	50
1992	14	61	8	0	83	2.8	23	13	10	29
1993	---	---	12	45	67	2.8	---	---	18	24
1994	17	45	13	0	75	2.0	38	29	17	38
1995– 1996	<u>No survey</u>									
1997	6	11	12	31	60	2.1	---	---	20	29
1998	14	9	10	37	70	2.6	---	---	14	27
1999	14	11	13	70	108	2.4	17.3	16	12	45
2000	---	10	12	57	79	2.4	---	---	15	33
<u>Chilkat Range 1968–2000</u>										
1968	1	2	1	0	4		50	50	25	
1975	0	3	2	0	5		0	67	40	
1986	3	10	6	0	19	1.5	30	60	32	
1987– 1991	<u>No survey</u>									
1992	---	---	11	79	97	1.3	---	---	13	75
1993– 1995	<u>No survey</u>									
1996	---	---	---	20	20	---	---	---	---	
1997	<u>No survey</u>									
1998	6	15	16	35	72	1.1	---	---	22	64
1999	<u>No survey</u>									
2000	---	6	6	113	125	1.7	---	---	---	75
<u>Taku River 1978–2000</u>										
1978	3	30	15	---	49	3.4	10	50	31	14
1983	2	40	12	---	54	1.7	5	30	22	32
1986	2	42	1	---	45	1.8	5	2	2	25
1987	<u>No survey</u>									
1988	2	16	4	---	22	1.6	13	25	18	14
1989– 1997	<u>No survey</u>									
1998	---	1	1	3	5	---	---	---	---	---
1999	<u>No survey</u>									
2000	---	5	7	25	37	2.1	---	---	19	18

--- Incomplete survey data due to timing of survey.

Table 1 continued

Year	Bulls	Cows	Calves	Unknown	Total moose	Count time (hrs)	Bulls per 100F	Calves per 100F	Calves % in herd	Moose per hour
<u>Gustavus Forelands 1998–2000</u>										
1998	---	48	54	131	185	1.9	---	---	29	95
1999	<u>No survey</u>									
2000	---	45	45	117	207	3.7	---	---	22	57



Table 2 Unit 1C moose age at harvest, Berners Bay, regulatory years 1990 through 2000

Year	0.5	1.5	2.5	3.5	4.5	5.5	6.5	Age 7.5	Class 8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	Total kill	% aged	Mean age
<u>Males</u>																			
1990	0	0	3	0	1	1	0	0	0	0	0	0	0	0	0	0	5	100	3.5
1991	0	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	5	100	3.3
1992	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	5	20	3.5
1993	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	7	100	4.3
1994	0	2	1	2	0	1	0	0	0	0	0	0	0	0	0	1	8	88	4.7
1995	0	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	7	100	1.7
1996	0	5	1	0	0	1	0	0	0	0	0	0	0	0	0	0	7	100	1.7
1997	0	2	1	5	0	0	0	0	0	0	0	0	0	0	0	0	8	100	2.4
1998	0	2	3	0	0	0	0	0	2	0	0	0	0	0	0	0	8	88	3.4
1999	0	3	1	3	1	0	1	0	0	1	0	0	0	0	0	0	10	100	3.8
2000	0	0	2	2	3	0	0	0	0	0	0	1	0	0	0	0	8	100	4.6
<u>Females</u>																			
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	---
1991	0	0	4	0	0	0	0	1	0	0	0	0	0	0	0	0	5	100	1.8
1992	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	75	1.7
1993	0	1	0	2	0	0	1	0	1	1	0	1	0	0	0	0	7	100	5.9
1994	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	1	7	71	6.6
1995	0	1	1	1	2	0	0	1	0	0	0	0	0	0	0	0	6	100	3.5
1996	0	0	1	0	2	0	0	0	1	0	1	0	0	1	0	0	7	100	6.1
1997	0	1	0	3	2	0	0	0	0	0	1	0	0	0	0	0	7	100	4.0
1998	0	2	3	1	0	0	0	0	0	0	0	0	0	1	0	0	7	100	3.4
1999	0	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	5	100	2.3
2000	0	0	1	1	3	0	1	0	0	0	1	0	0	0	0	0	7	100	3.3

Table 3 Unit 1C moose age at harvest, excluding Berners Bay, regulatory years 1990 through 2000<sup>1</sup>

Year	0.5	1.5	2.5	3.5	4.5	5.5	6.5	Age 7.5	Class 8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	Total kill	% Aged	Mean Age
<u>Chilkat Range</u>																			
1990	0	6	1	1	0	1	0	0	0	0	0	0	0	0	0	0	16	69	2.3
1991	0	3	0	2	0	0	0	0	1	0	0	0	0	0	0	0	6	100	3.3
1992	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	9	56	2.9
1993	0	5	0	2	3	0	1	0	0	0	1	0	0	0	0	0	17	71	3.8
1994	0	3	0	1	0	0	0	2	0	0	1	0	0	0	0	0	7	100	4.8
1995	0	3	3	2	0	0	2	1	1	1	0	0	0	0	0	0	14	93	4.4
1996	0	3	4	5	1	3	1	0	0	4	0	0	0	0	0	0	21	98	4.1
1997	0	5	0	3	1	1	0	1	0	1	0	0	0	0	0	0	13	92	3.3
1998	0	10	2	7	1	0	2	2	1	0	0	0	0	0	0	0	28	89	2.9
1999	0	5	3	0	1	1	0	0	0	0	0	0	0	0	0	0	11	91	2.5
2000	0	1	3	6	1	0	1	0	0	1	0	0	0	0	0	0	14	93	3.2
<u>Gustavus Forelands</u>																			
1990	0	1	2	2	1	0	1	0	0	0	0	0	0	0	0	0	8	88	3.5
1991	0	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	6	83	3.1
1992	0	1	2	1	1	1	0	1	0	0	0	0	0	0	0	0	11	64	3.9
1993	0	3	5	4	0	1	0	0	0	0	0	0	0	0	0	0	13	100	2.8
1994	0	7	4	1	1	3	0	0	1	0	0	0	0	0	0	0	20	85	3.1
1995	0	4	9	3	2	1	0	0	0	0	0	0	0	0	0	0	21	90	2.8
1996	0	18	5	4	1	1	0	0	0	0	0	0	0	0	0	0	30	97	2.2
1997	1	11	9	2	2	0	2	0	0	0	0	0	0	0	0	0	31	86	2.0
1998	2	24	10	5	3	0	0	0	0	0	0	0	0	0	0	0	48	92	1.4
1999	3	20	10	2	1	2	0	0	1	0	0	0	0	0	0	0	42	93	2.2
2000	0	23	8	9	4	2	0	0	0	0	0	0	0	0	0	0	47	98	2.2

<sup>1</sup> Does not include 2 cow moose taken illegally in Gustavus in 2000.

Table 3 continued

Year	0.5	1.5	2.5	3.5	4.5	5.5	6.5	Age 7.5	Class 8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	Total kill	% Aged	Mean Age
<u>Taku River</u>																			
1990	0	9	2	1	0	0	0	0	0	0	0	0	0	0	0	0	20	60	2.3
1991	0	5	4	1	0	0	0	1	0	0	0	0	0	0	0	0	14	78	3.1
1992	0	3	3	1	1	1	1	0	0	0	0	0	0	0	0	0	19	53	3.4
1993	0	3	4	1	3	1	0	0	0	0	0	0	0	0	0	0	15	73	2.9
1994	0	8	3	2	1	0	0	0	0	0	0	0	0	0	0	0	16	88	2.2
1995	0	7	4	0	1	1	1	0	0	0	0	0	0	0	0	0	14	100	2.6
1996	0	10	3	0	0	0	1	0	0	0	0	0	0	0	0	0	15	93	2.1
1997	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	6	83	3.1
1998	0	11	0	2	0	0	0	0	0	0	0	0	0	0	0	0	13	100	1.8
1999	1	9	4	1	0	0	0	0	0	0	0	0	0	0	0	0	17	88	1.8
2000	0	15	3	3	1	0	1	0	0	0	0	0	0	0	0	0	23	100	2.2

Table 4 Unit 1C moose hunter effort and success, regulatory years 1990 through 2000<sup>1</sup>

Year	Permits issued <sup>1</sup>	<u>Successful hunters</u>			<u>Unsuccessful hunters</u>			<u>Total hunters</u>		
		NR hunters	Total days	Avg. days	NR hunters	Total days	Avg. days	NR hunters	Total days	Avg. days
<u>Berners Bay</u>										
1990	5	5	14	2.8	0	0	0.0	5	14	2.8
1991	10	10	20	2.0	0	0	0.0	10	20	2.0
1992	10	9	23	2.6	0	0	0.0	9	23	2.6
1993	15	14	29	2.1	1	7	7.0	15	36	2.4
1994	15	14	38	2.7	0	0	---	14	38	2.7
1995	15	13	40	3.1	1	6	6.0	14	46	3.3
1996	17	14	35	2.5	0	0	---	14	35	2.5
1997	15	15	42	2.8	0	0	0	150	42	2.8
1998	15	15	29	1.9	0	0	0	15	29	1.9
1999	18	16	43	2.7	0	0	0	16	43	2.7
2000	20	15	42	2.8	2	13	6.5	17	55	3.2
<u>Chilkat Range</u>										
1990	331	16	57	3.6	94	267	2.8	106	350	3.3
1991	316	6	17	2.8	37	143	3.9	43	160	3.7
1992	317	9	41	4.6	62	234	3.8	71	275	3.9
1993	352	17	69	4.1	62	259	4.2	79	328	4.2
1994	346	7	15	2.1	47	173	3.7	54	188	3.5
1995	380	13	34	2.6	96	375	3.9	109	409	3.8
1996	396	17	31	1.8	65	308	4.7	82	339	4.1
1997	489	13	42	3.2	92	370	4.2	105	412	3.9
1998	441	28	85	3.0	58	190	3.3	86	275	3.2
1999	476	11	47	4.3	81	374	4.6	92	421	4.6
2000	455	14	47	3.4	82	326	4.0	96	373	3.9
<u>Gustavus Forelands</u>										
1990 <sup>2</sup>	---	8	26	---	NA	NA	---	NA	NA	---
1991	---	6	21	3.5	29	163	5.6	35	184	5.3
1992	---	11	38	3.5	36	163	4.5	47	201	4.3
1993	---	13	59	4.5	45	229	5.1	58	288	5.0
1994	---	20	96	4.8	64	281	4.4	84	377	4.5
1995	---	21	90	4.3	69	294	4.3	90	384	4.3
1996	---	30	115	3.8	65	331	5.1	95	446	4.7
1997	---	31	125	4.0	73	279	4.1	104	404	4.1
1998	---	48	139	3.0	71	255	3.7	119	394	3.4
1999	---	42	173	4.1	103	528	5.1	145	701	4.8
2000	---	47	183	3.9	85	396	4.7	132	579	4.4

<sup>1</sup> Total permit numbers include hunters without effort information. RY 2000 does not include 2 illegal cows and 1 duplicate permit.

Table 4 Continued

Year	Permits issued	Successful hunters			Unsuccessful hunters			Total hunters		
		NR hunters	Total days	Avg. days	NR hunters	Total days	Avg. days	NR hunters	Total days	Avg. days
Taku River										
1990	---	20	89	4.5	94	339	4.0	114	424	4.0
1991	---	14	52	3.7	88	358	4.1	102	410	4.0
1992	---	19	79	4.2	104	409	3.9	123	488	4.0
1993	---	16	40	2.7	77	318	4.4	93	358	4.1
1994	---	17	40	2.4	70	323	4.8	87	363	4.3
1995	---	14	48	3.4	71	254	3.6	85	302	3.6
1996	---	15	57	4.4	85	320	3.8	100	377	3.8
1997	---	6	25	5.0	85	365	4.5	91	390	4.5
1998	---	14	49	3.5	47	219	4.7	61	268	4.4
1999	---	16	40	2.5	48	146	3.0	64	186	2.9
2000	---	23	49	2.1	45	162	3.6	68	211	3.1

<sup>1</sup> Number of registration permits shown for the Chilkat Range is the total number of permits issued for all of Unit 1C excluding Berners Bay; only permittees who hunted may be categorized to specific hunt areas.

<sup>2</sup> Effort information for unsuccessful hunters at Gustavus Forelands is combined with the Chilkat Range for 1990.

Table 5 Unit 1C moose historical harvests, number of hunters, and percent success, regulatory years 1990 through 2000

Year	NR males	NR females	NR unknown	Total kill	NR hunters	% success
<u>Berners Bay</u>						
1990	5	0	0	5	5	100
1991	5	5	0	10	10	100
1992	5	4	0	9	9	100
1993	7	7	0	14	15	93
1994	8	6	0	14	14	100
1995	7	6	0	13	14	93
1996	7	7	0	14	14	100
1997	8	7	0	15	15	100
1998	8	7	0	15	15	100
1999	10	5	0	15	16	94
2000	8	7	0	15	15	100
<u>Chilkat Range</u>						
1990	16	0	0	16	106 <sup>1</sup>	23
1991	6	0	0	6	47	13
1992	11	0	0	11	42	26
1993	17	0	0	17	90	19
1994	7	0	0	8	56	14
1995	13	0	0	13	109	12
1996	17	0	0	17	82	21
1997	13	0	0	13	105	12
1998	28	0	0	28	86	33
1999	11	0	0	11	100	11
2000	14	0	0	14	105	13
<u>Gustavus Forelands</u>						
1990	8	0	0	8	n/a	n/a
1991	6	0	0	6	35	17
1992	9	0	0	9	47	19
1993	13	0	0	13	58	22
1994	19	0	0	19	84	23
1995	21	0	0	0	90	23
1996	30	0	0	29	95	31
1997	30	1 <sup>1</sup>	0	31	104	29
1998	47	1 <sup>1</sup>	0	48	118	40
1999	41	1 <sup>1</sup>	0	42	146	29
2000	46	3 <sup>1</sup>	0	49	132	37

<sup>1</sup>Documented illegal kills.

Table 5 continued

Year	NR males	NR females	NR unknown	Total kill	NR hunters	% success
<u>Taku River</u>						
1990	20	0	0	20	114 <sup>2</sup>	18
1991	14	0	0	14	102	14
1992	19	0	0	19	123	15
1993	16	0	0	16	93	17
1994	17	0	0	17	87	18
1995	14	0	0	14	85	16
1996	15	0	0	15	97	15
1997	6	0	0	6	91	15
1998	14	0	0	14	61	23
1999	16	0	0	16	65	25
2000	23	0	0	23	69	33

<sup>1</sup>Twelve of 106 hunters were assigned to the Chilkat Range (based on proportion hunting in each area), as they reported no specific area within Unit 1C.

<sup>2</sup> Twelve of 114 hunters were assigned to the Taku River (based on proportion hunting in each area) as they reported no specific area within Unit 1C.

Table 6 Unit 1C annual moose kill by community of residence, regulatory years 1990 through 2000

Year	Total kill	Gustavus	Juneau	Sitka	Wrangell	Petersburg	Haines	Other Alaska	Non- resident
<u>Berners Bay</u>									
1990	5	0	5	0	0	0	0	0	0
1991	10	0	9	0	0	0	1	0	0
1992	9	0	9	0	0	0	0	0	0
1993	14	0	13	0	0	0	1	0	0
1994	14	0	13	0	0	0	1	0	0
1995	13	0	11	0	0	0	0	2	0
1996	14	0	14	0	0	0	0	0	0
1997	15	0	13	1	0	0	0	0	1
1998	15	0	12	1	0	1	1	0	0
1999	15	0	14	0	0	0	1	0	0
2000	15	0	14	0	0	1	0	0	0
<u>Chilkat Range</u>									
1990	16	0	13	0	0	0	3	0	0
1991	6	0	6	0	0	0	0	0	0
1992	9	0	8	0	0	0	1	0	0
1993	17	0	11	0	0	0	5	1	0
1994	7	0	6	0	0	0	0	1	0
1995	13	2	10	0	0	0	0	1	0
1996	17	0	14	0	0	0	0	3	0
1997	13	0	12	0	0	0	0	1	0
1998	28	1	20	0	0	0	1	6	0
1999	11	0	7	0	0	0	0	2	1
2000	14	1	10	1	0	0	0	1	1
<u>Gustavus Forelands</u>									
1990	8	7	1	0	0	0	0	0	0
1991	6	6	0	0	0	0	0	0	0
1992	11	10	0	0	0	0	0	0	1
1993	11	2	0	0	0	0	0	0	0
1994	20	15	4	0	0	0	0	0	1
1995	21	13	7	0	0	0	0	1	0
1996	30	22	7	0	0	0	0	0	1
1997	31	20	7	1	0	0	0	2	1
1998	48	27	16	1	0	0	1	2	1
1999	42	21	13	0	0	0	1	6	1
2000	49	29	15	0	0	0	1	3	1



Table 6 continued

Year	Total kill	Gustavus	Juneau	Sitka	Wrangell	Petersburg	Haines	Other Alaska	Non- resident
<u>Taku River</u>									
1990	20	0	18	1	0	1	0	0	0
1991	14	0	13	0	0	1	0	0	0
1992	19	0	15	0	0	2	0	1	1
1993	15	0	12	0	0	2	1	0	0
1994	17	0	10	0	0	2	0	2	0
1995	14	0	12	1	0	0	0	1	0
1996	15	1	14	0	0	0	0	0	0
1997	6	0	5	1	0	0	0	0	0
1998	14	0	13	1	0	0	0	0	0
1999	17	0	16	1	0	0	0	0	0
2000	28	0	21	1	1	0	0	0	0

Table 7 Unit 1C successful moose hunters transport methods, regulatory years 1993 through 2000

Year	<u>Airplane</u>		<u>Boat</u>		<u>3 or 4 wheeler</u>		<u>Hwy vehicle</u>		<u>Foot</u>	
	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
<u>Berners Bay</u>										
1993	0	---	14	(100)	0	---	0	---	0	---
1994	0	---	14	(100)	0	---	0	---	0	---
1995	1	(8)	12	(92)	0	---	0	---	0	---
1996	1	(7)	13	(93)	0	---	0	---	0	---
1997	0	---	15	(100)	0	---	0	---	0	---
1998	0	---	15	(100)	0	---	0	---	0	---
1999	0	---	15	(100)	0	---	0	---	0	---
2000	0	---	15	(100)	0	---	0	---	0	---
<u>Chilkat Range</u>										
1993	5	(29)	12	(71)	0	---	0	---	0	---
1994	0	---	7	(100)	0	---	0	---	0	---
1995	5	(38)	8	(62)	0	---	0	---	0	---
1996	9	(53)	8	(47)	0	---	0	---	0	---
1997	6	(46)	7	(54)	0	---	0	---	0	---
1998	9	(32)	19	(68)	0	---	0	---	0	---
1999	8	(73)	3	(27)	0	---	0	---	0	---
2000	7	(50)	7	(50)	0	---	0	---	0	---
<u>Gustavus Forelands</u>										
1993	1	(8)	4	(31)	1	(8)	4	(31)	3	(23)
1994	1	(5)	3	(15)	0	---	11	(55)	5	(25)
1995	3	(14)	7	(33)	0	---	2	(10)	0	---
1996	1	(3)	7	(23)	3	(10)	4	(13)	12	(40)
1997	0	---	9	(31)	0	---	4	(14)	16	(55)
1998	0	---	10	(21)	0	---	21	(44)	17	(35)
1999	5	(12)	9	(22)	1	(2)	14	(34)	12	29
2000	5	(11)	6	(13)	1	(2)	20	(43)	14	(30)
<u>Taku River</u>										
1993	4	(25)	11	(69)	0	---	0	---	1	(6)
1994	3	(18)	14	(82)	0	---	0	---	0	---
1995	2	(14)	12	(86)	0	---	0	---	0	---
1996	6	(33)	12	(67)	0	---	0	---	0	---
1997	0	---	6	(100)	0	---	0	---	0	---
1998	0	---	14	(100)	0	---	0	---	0	---
1999	0	---	17	(100)	0	---	0	---	0	---
2000	2	---	21	(100)	0	---	0	---	0	---

Table 8 Unit 1C moose hunters commercial services use, regulatory years 1991 through 1998

Year	Unit residents		Other residents		Non-residents		Total use		Transport	Non-guided services	Other services
	No	Yes	No	Yes	No	Yes	No	Yes			
<u>Berners Bay</u>											
1991	6	2	0	0	0	0	6	2	0	0	2
1992	9	1	0	0	0	0	9	1	0	0	1
1993	13	0	1	0	0	0	14	0	0	0	0
1994	11	0	1	0	0	0	12	0	0	0	0
1995	13	0	1	0	0	0	14	0	0	0	0
1996	12	1	0	0	0	0	12	1	1	0	0
1997	13	0	1	0	0	1	14	1	1	0	0
1998	12	0	2	1	0	0	14	1	0	0	1
1999	15	1	0	0	0	0	15	1	0	0	0
2000	15	0	2	0	0	0	17	0	0	0	0
<u>Chilkat Range</u>											
1992	88	6	12	4	0	1	100	11	10	1	0
1993	37	2	20	7	0	0	57	10	5	3	2
1994	26	5	19	0	0	0	45	4	0	0	0
1995	72	2	29	0	0	0	101	2	2	0	0
1996	56	5	13	0	0	0	64	5	5	0	0
1997	66	4	13	0	1	3	80	7	7	0	0
1998	70	1	11	4	0	0	81	5	5	0	0
1999	74	7	4	2	0	1	78	10	10	0	0
2000	57	5	11	1	0	2	68	8	8	0	0
<u>Gustavus Forelands</u>											
1992	8	0	0	0	0	0	8	0	0	0	0
1993	55	4	3	0	0	0	58	4	4	0	0
1994	81	1	0	0	1	0	82	2	2	0	0
1995	80	0	10	0	0	0	90	0	0	0	0
1996	78	3	12	1	0	1	95	5	5	0	0
1997	81	2	7	0	1	2	89	4	1	2	1
1998	104	2	9	0	1	0	114	2	2	0	0
1999	107	2	5	1	1	0	113	3	3	1	0
2000	100	3	4	0	3	0	107	3	3	0	0
<u>Taku River</u>											
1992	56	8	8	2	0	0	64	10	7	0	3
1993	61	7	71	7	0	0	132	14	12	2	0
1994	50	4	23	3	0	0	73	7	7	0	0
1995	70	5	9	0	0	0	79	5	3	0	2
1996	71	5	3	1	0	2	74	8	2	2	4
1997	60	6	4	0	0	0	64	6	5	0	1
1998	53	3	4	0	0	0	57	3	3	0	0
1999	53	1	6	0	1	0	56	1	1	0	0
2000	53	1	3	0	0	0	56	1	0	1	0

**SPECIES**  
**MANAGEMENT REPORT**

**Alaska Department of Fish and Game**  
**Division of Wildlife Conservation**  
(907) 465-4190 PO BOX 25526  
JUNEAU, AK 99802-5526

**MOOSE MANAGEMENT REPORT**

From: 1 July 1999  
To: 30 June 2001

**LOCATION**

**GAME MANAGEMENT UNIT:** 1D (2,700 mi<sup>2</sup>)

**GEOGRAPHICAL DESCRIPTION:** That portion of the Southeast Alaska mainland lying north of the latitude of Eldred Rock, excluding Sullivan Island and the drainages of Berners Bay.

**BACKGROUND**

Most Unit 1D moose inhabit the Chilkat River watershed and the Chilkat Peninsula. Within this area there is an estimated 200–250 mi<sup>2</sup> of summer range and 110–120 mi<sup>2</sup> of winter range, including 80 mi<sup>2</sup> of preferred winter range. Small areas of moose habitat are also located in the Chilkoot, Katzehin, and Warm Pass valleys, and along the western shore of Lynn Canal (ADF&G 1990).

Moose immigrated to the Chilkat River Valley from drainages in Canada around 1930. Moose populations peaked in the Chilkat Valley in the mid 1960s, when as many as 700 animals may have been present (ADF&G 1991). By the early 1970s the moose population had sharply declined to 400–500 animals, possibly because of overutilization of the range and overharvest. Survey data collected during the mid 1980s suggested that the herd had declined to 400 animals. Recent surveys suggest that the moose population is now between 300 and 400 animals.

Unit 1D residents have expressed concern over the decrease in moose numbers, the subsequent decline in hunting opportunity, and the "stampede" nature of registration permit hunts with low harvest quotas. Harvest objectives have been formulated based on survey data and harvest trends. Regulations were introduced (a spike-fork/50-inch/3 brow tine requirement) to slow the pace of the hunt, but these were preempted when a Tier II subsistence hunt was implemented by the Board of Game (BOG) for the 1990 season. Widespread dissatisfaction with the allocation of 20 Tier II permits and concern over the status of the herd contributed to local opposition to holding a hunt in 1991, and no permits were issued that year. In 1992 the season was closed by emergency order before Tier II permits were issued.

In March 1993 the BOG authorized a Tier II antler restriction hunt for Unit 1D. This hunt allowed more hunter opportunity while affording protection to bulls that did not meet antler requirements. The objective is to spare a large proportion of the young and middle-aged bulls from harvest to strengthen the breeding age segment of the population while still allowing many local hunters the opportunity to harvest a moose.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

Population management objectives identified by staff for Unit 1D are as follows:

1. Maintain a post-hunt population of 350 moose;
2. Maintain a post-hunt bull-to-cow ratio of 25:100;
3. Allow for 200 hunters expending 600 hunter days; and
4. Reach a harvest of 25 moose with a hunter success rate of 12%.

### **METHODS**

Chilkat River valley aerial surveys were conducted in February 2000 and December 2000 (Table 1). Areas covered included the Chilkat River valley from Murphy Flats to Turtle Rock, and the Klehini, Takhin, Tsirku, Kelsall, and Chilkoot river valleys.

Each year, prior to the moose hunt we held an informational meeting in Haines to discuss the identification of legal and non-legal moose. We showed the video “Is This Moose Legal?” to help hunters interpret the spike-fork/50-inch/3 brow tine regulation used to manage the Unit 1D hunt.

In 1999 and 2000 we maintained a moose check station in Haines and required hunters to check in harvested moose within 2 days of the kill. Incisors were collected from harvested moose as a condition of the Tier II permit. All permittees were also required to turn in a hunt report card specifying if they hunted, hunt duration, hunt location, transport means (for all hunters), and date of kill (for successful hunters). We also collected data on antler measurements and configurations.

## **RESULTS AND DISCUSSION**

### **POPULATION STATUS AND TREND**

#### *Population Size*

We conducted winter surveys in February and December 2000. During the February survey, 75 moose were counted under poor viewing conditions (Table 1). In December 2000, under excellent viewing conditions, 222 moose were enumerated and approximately half were classified by age and sex. We believe moose in the Chilkat Valley number between 300 and 400 animals.

### *Population Composition*

We did not obtain complete sex and age composition information during the February 2000 survey. Bulls had shed their antlers and visibility was poor because of patchy snow cover. We classified most adult moose as sex unknown, and listed only those adults accompanied by calves as females (Table 1). Our December 2000 survey was flown earlier than the previous winter and under better visibility conditions, and we were able to classify approximately half of the moose we saw. We classified as calves 15.7% of the moose seen on this survey, similar to percentages seen in previous years. The minimal bull-to-cow ratio was determined to be 18:100. Mean age at harvest was 4.1 years during this report period, a decrease from the mean age of 5.6 and 4.2 years during the previous 2 report periods.

It is interesting to compare the age at harvest from the 1980s to the post-Tier II era (1993) and to the present. While the mean age was less than 4 years old for the seasons during 1983 through 1989 (when any bull was legal), the mean age was greater than 5 years old from 1993 through 1995 (immediately after the antler restriction regulation was implemented). The mean age has been around 4 years old during 1996–2000. The age distribution of animals harvested from 1993–1995 is skewed towards older animals, most likely a result of the spike–fork/50–inch/3 brow tine regulation implemented in 1993, and the fact that no hunts were held during 1991 and 1992. The increase in older bulls available after 2 closed seasons provided for a harvest of older animals for a time, but since then the mean age has declined.

### MORTALITY

#### *Harvest*

<u>Season and bag limit</u>	<u>Resident hunters</u>	<u>Nonresident hunters</u>
1 bull with spike-fork or 50-inch antlers or antlers with 3 or more brow tines on one side by Tier II subsistence hunting permit only; up to 200 permits may be issued	Sept. 15–Sept. 30 (Subsistence hunt only)	No open season.

Game Board Actions and Emergency Orders: During both years of this report period, Unit 1D moose hunting remained open for the entire 2-week season. In addition to the limiting aspects of a spike-fork/50-inch/3 brow tine hunt, we also managed for a harvest guideline of 25 bulls.

Hunter Harvest: In this period, 1999–2000, the mean annual harvest was 19 moose, similar to 18 moose during 1997–1998, but substantially lower than the mean harvest of 27 during 1995–1996. Some of the variation in harvest is due to weather conditions changing hunting patterns, and not a reflection of the population size.

Permit Hunts: All moose hunting in Unit 1D is administered under a Tier II subsistence permit system. Two hundred permits were issued during each year (Table 3), but the number of applicants declined from 293 in 1997 to 262 in 1999. In 2000, the number of applicants increased to 301.

Hunter Residency and Success: During the report period local residents were the primary Unit 1D moose hunters, although all Alaskans were eligible to apply for this (or any other Tier II hunt). Residents of Haines or Klukwan (Table 4) took 19 of the 21 moose harvested in 1999 and 16 of the 18 moose harvested in 2000. Hunter success was 12% during this and the previous report period, a decline from the mean of 17% reported during 1995–1996 (Table 5). Successful hunters took an average of 4.1 days per kill in 1999 and 2000 (Table 3). Total hunter days expended were 1,059 in 1999 and 895 in 2000 (Table 3), nearly double the hunter days expended from 1992–1994. The increase in hunter days in recent years is partly due to the guideline harvest not being reached, allowing the season to run its two week length. This is also reflected in an increase in number of days hunted by successful hunters.

Harvest Chronology: Since 1995 the opening date of the Tier II moose season has been 2 weeks earlier than former years, beginning on 15 September rather than 1 October. Because of this earlier start date, it can be difficult for hunters to locate and positively identify a legal bull due to the presence of leaves on trees and shrubs.

Transport Methods: Most Unit 1D moose hunters use boats or highway vehicles (Table 6). During the 1999 and 2000 hunting seasons, 71% and 67% of successful hunters used boats, respectively. Nearly all of the remaining successful hunters used highway vehicles (Table 6).

Commercial Services: Only 4 hunters used commercial services during the report period (Table 7). This is not surprising because virtually all hunters reside within or very near the subunit, and are well equipped for moose hunting. Also, many hunters have hunted together for a number of years, and in some instances share transportation and camps.

Other Mortality: Unit 1D residents have suggested that the local brown bear population has increased in recent years, and that bear predation on moose calves may be partly responsible for low recruitment rates observed. Data is not available to support this contention. During this report period, aerial surveys documented calf percentages similar to those seen in recent years, and predation is not indicated as a problem. In some years deep snow undoubtedly contributes to calf mortality, although conditions during this report period were relatively mild. Deteriorating range conditions may also play a role in low calf production and survival (Hundertmark et al., 1983).

The abundance of willows adjacent to the Haines Highway has led to several moose/vehicle collisions over the years. However, we have not collected information on these kills consistently over time, nor have we been able to obtain jaws, and thus ages, from these moose. We estimate about 4 moose are struck and killed by highway vehicles in the subunit each winter.

Poaching occurs, but the number of moose lost to this activity is not known. There is some degree of unreported harvest of illegal bull moose that are shot and left by hunters, although we believe that this number is relatively small.

Habitat: Nearly all moose habitat in this subunit lies within the Haines State Forest, managed under multiple-use guidelines of the 1986 Haines State Forest Management Plan. The plan's goals include an annual timber harvest of up to 8.8 million board feet (approximately 300 to 580 acres), at a rotation rate of 125 years. While some increased browse production may occur in

logged areas, the extent, duration, and value of deciduous reproduction in these areas has not been determined. The long-term usefulness of cutover areas to moose will be reduced if timber harvest occurs in high-value wintering areas, and if cutover areas are managed to produce second-growth coniferous stands rather than deciduous browse species. It is also important to note that in Southeast Alaska it has not been determined how important coniferous stands are for moose during periods of deep snow, when they may provide critical escape cover from predation and better foraging opportunities.

Habitat changes within non-forested portions of the area are also of concern. Research in the early 1980s showed a low proportion of young willow plants in shrub stands in the Chilkat River valley, and it is suspected that post-glacial land uplift (isostatic rebound) is causing permanent habitat change. Removal of decadent alder and cottonwood overstories in order to release willow, red-osier dogwood, and other browse species may counteract long-term changes, at least for awhile. There is some degree of local interest in mechanically changing vegetation in areas close to Haines, but no efforts have been made to date.

## **CONCLUSIONS AND RECOMMENDATIONS**

The management objectives listed at the beginning of this report were adopted from the Strategic Plan for Management of Moose in Region I, Southeast Alaska 1990–94 (ADF&G, 1991). We were not able to collect data needed to determine the bull-to-cow ratio due to the date of our surveys. We believe we were close to the objective of maintaining a population of 350 moose, based on our aerial survey information. The harvest objective of 25 bulls was not met. The number of hunter-days was half again higher than the objective. We met the objective of a 12% hunter success rate.

The effect of predation upon moose calf survival in this area is unknown. An apparently healthy brown bear population (as well as a less prominent black bear population) may account for substantial summer mortality, according to anecdotal accounts. Winter wolf predation does not appear to be a serious problem except when moose movements are restricted by extremely deep snow.

McCarthy (ADF&G, 1990) called for investigation into the relationship between timber harvest and moose habitat in the Chilkat River valley. Other means of converting decadent hardwood stands to encourage growth of browse species should be pursued and tried on a pilot basis, while maintaining adequate coniferous growth to serve as escape cover.

Recent surveys suggest that moose numbers in Unit 1D are no longer declining, and that the present regulatory structure supports a population concomitant with habitat capabilities. Predation, deep snows, and mediocre habitat point to the need for regular surveys to better understand the status and trend of the population.



## LITERATURE CITED

- ADF&G. 1990. Moose. Annual Report of Survey-Inventory Activities, 1 July 1988-30 June 1989. Fed. Aid in Wildlife Restoration. Vol. XX, Part VIII. Proj. W-23-2, Study 1.0. Juneau. 428 pp.
- ADF&G. 1991. Strategic Plan for Management of Moose in Region I, Southeast Alaska 1990-94. Div. of Wildlife Conservation. Juneau. 105pp.
- HUNDERTMARK, K.J., W.L. EBERHARDT AND R.E. BALL. 1983. Winter habitat utilization by moose and mountain goats in the Chilkat valley. Alaska Dep. Fish and Game. Final report for the Haines-Klukwan Cooperative Resource Study. Juneau. 44pp.

**PREPARED BY:**

Polly Hessing  
Wildlife Biologist II

**SUBMITTED BY:**

Bruce Dinneford  
Regional Management Coordinator

Please cite any information taken from this section, and reference as:

Hessing, P. 2002. Unit 1D moose management report. Pages 42–54 *in* C. Healy, editor. Moose management report of survey and inventory activities 1 July 1999–30 June 2001. Alaska Department of Fish and Game. Project 1.0. Juneau, Alaska.

Table 1 Unit 1D moose aerial survey data, regulatory years 1982 through 2000

Regulator y year	Total males	Total females	Total calves	Unk	Total moose	Count time (hrs)	Bulls per 100F	Calves per 100F	Calves % in herd	Moose per hour
1982	34	115	51	---	200	4.8	30	44	36	42
1983	16	148	47	---	211	5.8	11	32	22	36
1984	15	135	37	---	187	5.2	11	27	20	36
1985	23	155	29	---	207	5.5	15	19	14	38
1986	33	93	13	---	139	3.5	36	14	14	40
1987 <sup>1</sup>	---	---	29	174	203	---	---	---	14	53
1988 <sup>2</sup>	---	---	31	206	252	4.4	---	---	12	57
1989	18	45	10	---	73	1.5	40	22	14	48
1990 <sup>3</sup>	18	67	6	---	91	3.5	30	9	7	26
1991	23	138	22	---	183	7.8	17	17	13	23
1992	27	98	21	---	149	2.9	28	21	14	52
1993	---	---	19	157	176	5.8	---	---	11	31
1994	41	77	27	---	149	4.3	53	35	18	35
1995	No survey									
1996	48	121	31	7	207	3.8	40	26	16	54
1997	10	37	36	115	198	4.1	---	---	18	48
1998	20	23	25	103	171	5.2	---	---	15	39
1999 <sup>4</sup>	---	4	4	67	75	4.9	---	---	---	15
2000	28	30	35	129	222	5.5	18	22	15.7	56

<sup>1</sup>Late winter survey, sex and age ratios unreliable. In a second late winter survey, a total of 215 moose (29 calves) were counted at a rate of 57 moose per hour.

<sup>2</sup>Late-winter survey, sex and age ratios unreliable.

<sup>3</sup>Numbers are for 12/14/1990 survey. A second survey, flown only in the Chilkat Valley on 3/22/1991, resulted in a total count of 28 moose in 2.9 hours.

<sup>4</sup>Marginal survey conditions, minimal composition information.

Table 2 Unit 1D age structure of harvested moose, regulatory years 1983 through 2000

Year	0.5	1.5	2.5	3.5	4.5	5.5	6.5	Age class		9.5	10.5	11.5	12.5	13.5	14.5	15.5	Total kill	% aged	Mean age
1983	1	3	7	10	6	0	1	2	0	1	0	0	0	0	0	0	62	50	3.8
1984	2	15	12	2	2	1	0	0	0	0	0	0	0	0	0	0	36	94	2.3
1985	0	7	4	1	0	1	0	0	0	0	0	0	0	0	0	0	14	93	2.3
1986	Season closed																		
1987	0	3	6	7	3	1	0	0	0	0	0	0	0	0	0	0	22	91	3.2
1988	0	6	5	3	1	1	1	0	0	0	0	0	0	0	0	0	18	94	2.9
1989	0	10	5	2	2	0	0	0	0	0	0	0	0	0	0	0	18	100	2.3
1990																	19	0	---
1991–1992	Season closed																		
1993	0	2	3	3	4	2	3	1	4	0	1	0	1	0	0	0	24	100	5.1
1994 <sup>1</sup>	0	0	0	1	1	8	2	2	0	0	0	0	1	0	0	0	17	94	5.7
1995	0	0	1	5	4	3	5	3	3	1	2	0	0	0	0	0	27	100	5.6
1996	0	5	2	3	2	4	2	2	1	1	0	0	0	0	0	0	27	78	4.0
1997	0	2	0	3	6	1	1	1	0	1	0	0	0	0	0	0	15	88	4.1
1998	0	4	2	0	7	2	0	1	0	1	2	0	0	0	0	0	19	100	4.3
1999	0	6	2	3	2	3	2	0	2	0	1	0	0	0	0	0	21	100	3.8
2000	0	2	4	1	2	3	3	0	2	0	0	0	0	0	0	0	18	95	4.1

<sup>1</sup>Does not include an illegally harvested bull, age 3.

Table 3 Unit 1D moose hunter effort and success, regulatory years 1983 through 2000

Year	Permits issued	<u>Successful hunters</u>			<u>Unsuccessful hunters</u>			<u>Total hunters</u>		
		# hunters	Total # days	Avg. # days	# hunters	Total # days	Avg. # days	# hunters	Total # days	Avg. # days
1983	---	62			292			354		
1984	---	35	149	4.3	314	1540	4.9	349	1,689	4.8
1985	---	14	43	3.1	29	109	3.8	43	152	3.5
1986					Season closed					
1987	294	22	22	1.0	208	208	1.0	230	230	1.0
1988	259	18	18	1.0	188	188	1.0	206	206	1.0
1989	272	18	18	1.0	208	208	1.0	226	226	1.0
1990	20	19	48	2.5	1	7	7.0	20	55	28
1991– 1992					Season closed					
1993	176	24	45	1.9	83	182	2.3	107	227	2.2
1994	200	17	20	1.2	130	284	2.2	147	304	2.1
1995	200	27	58	2.1	130	401	3.1	157	459	3.0
1996	181	24	70	3.3	121	735	6.1	145	805	5.7
1997	200	17	50	3.8	130	891	6.9	145	941	6.6
1998	200	19	79	4.4	146	976	6.8	164	1,055	6.5
1999	200	21	87	4.1	137	972	7.1	158	1059	6.7
2000	200	18	74	4.1	138	821	5.9	156	895	5.7

Table 4 Unit 1D annual moose kill by community of residence, regulatory years 1984–2000

Regulatory year	Total kill	Haines	Skagway	Juneau	Sitka	Other Alaska	Non- resident
1984	35	23	1	7	2	1	0
1985	14	14	0	0	0	0	0
1986				Season closed			
1987	22	22	0	0	0	0	0
1988	18	18	0	0	0	0	0
1989 <sup>1</sup>	18	18	0	0	0	0	0
1990	19	19	0	0	0	0	0
1991–1992				Season closed			
1993	24	22	0	2	0	0	0
1994	17	17	0	0	0	0	0
1995	27 <sup>2</sup>	26	0	1	0	0	0
1996	27 <sup>3</sup>	23	0	0	0	1	0
1997	17	16	0	1	0	0	0
1998	19	18	0	1	0	0	0
1999	21	19	0	2	0	0	0
2000	18	16	0	1	0	1	0

<sup>1</sup>Includes 3 illegally harvested bulls.

<sup>2</sup>Includes 1 illegally harvested bull, 1 unrecovered bull, and 2 illegally harvested cows.

<sup>3</sup>Data are only available for 51 of the 54 moose listed for 1995/96.

Table 5 Unit 1D historical moose harvests, number of hunters, and percent success, regulatory years 1980 through 1998

Regulatory year	NR males	NR females	NR unknown	Total kill	NR hunters	Percent success
1980	48	0	0	48	342	14
1981	36	2	0	38	315	11
1982	24	1	0	25	267	9
1983	62	0	0	62	354	17
1984	35	1	0	36	349	10
1985	14	0	0	14	43	33
1986			Season closed			
1987	22	0	0	22	230	10
1988	18	0	0	18	206	9
1989	18	1	0	19	226	8
1990	19	0	0	19	20	95
1991–1992			Season closed			
1993	24	0	0	24	107	22
1994	17	0	0	17	147	12
1995	27 <sup>1</sup>	0	0	27	157	17
1996	25	2	0	27	145	17
1997	17	0	0	17	145	12
1998	19	19	0	19	164	12
1999	21	0	0	21	163	13
2000	18	0	0	18	160	11

<sup>1</sup>Includes 2 illegal bulls, one unrecovered bull, and 2 cows, these show up in the total kill of 27.

Table 6 Unit 1D transport methods used by successful moose hunters, regulatory years 1987 through 2000

Year	<u>Airplane</u>		<u>Boat</u>		<u>ORV</u>		<u>Highway vehicle</u>		<u>Other</u>	
	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
1987	3	(14)	12	(12)	1	(5)	6	(27)	0	---
1988	0	---	16	(88)	1	(6)	1	(6)	0	---
1989	2	(11)	10	(55)	2	(11)	4	(22)	1	(1)
1990	0	---	10	(58)	0	---	7	(37)	2	(8)
1991– 1992	Season closed									
1993	0	---	13	(54)	0	---	10	(45)	1	(4)
1994	0	---	13	(81)	0	---	3	(19)	0	---
1995	0	---	5	(22)	0	---	15	(65)	3	(13)
1996	3	(13)	10	(42)	0	---	10	(42)	1	(4)
1997	0	---	10	(71)	0	---	4	(29)	0	---
1998	1	(6)	11	(65)	2	(8)	3	---	0	---
1999	2	(10)	15	(71)	0	(0)	4	(19)	0	(0)
2000	0	(0)	12	(67)	2	(11)	4	(22)	0	(0)

Table 7 Unit 1D commercial services used by moose hunters, regulatory years 1993 through 2000

Year	<u>Unit residents</u>		<u>Other AK residents</u>		<u>Total use</u>		Other services
	No	Yes	No	Yes	No	Yes	
1993	60	1	3	1	73	2	2
1994	104	1	3	0	107	1	1
1995	97	0	3	0	100	0	0
1996	82	1	5	0	87	1	0
1997	76	2	3	0	79	2	0
1998	133	1	6	0	139	1	0
1999 <sup>1</sup>	126	2	15	0	141	2	1
2000 <sup>2</sup>	132	1	12	1	144	2	1

<sup>1</sup> Eleven percent did not report whether or not they used commercial services.

<sup>2</sup> Seven percent did not report whether or not they used commercial services.

Table 8 Unit 1D moose harvest by Wildlife Analysis Areas (WAA), regulatory years 1990 through 2000

Year	WAA							Unknown	Total
	4302	4303	4304	4405	4406	4407	4408		
1990	7	7	2	0	0	0	0	3	19
1991–1992			No season						---
1993	7	13	0	0	0	0	0	4	24
1994	5	10	0	0	0	0	0	2	14
1995	13	6	0	0	0	0	0	8	27
1996	8	8	0	3	0	0	0	3	22
1997	6	4	1	0	0	0	0	3	14
1998	10	2	0	0	0	0	0	6	18
1999	6	5	0	0	0	0	2	8	21
2000	6	5	0	0	0	0	2	5	18



**SPECIES**  
**MANAGEMENT REPORT**

**Alaska Department of Fish and Game**  
**Division of Wildlife Conservation**  
(907) 465-4190 PO BOX 25526  
JUNEAU, AK 99802-5526

**MOOSE MANAGEMENT REPORT**

From: 1 July 1999

To: 30 June 2001

**LOCATION**

**GAME MANAGEMENT UNIT:** 3 (3,000 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Islands of the Petersburg, Kake, and Wrangell area.

**BACKGROUND**

Isolated populations of moose (*Alces alces*) occur on the major islands of Unit 3 and are believed to be the *andersonii* subspecies. Moose on the Unit 3 islands emigrated in the past several decades from the Stikine and possibly Thomas Bay populations on the Unit 1B mainland. Increased sightings during the 1980s and 1990s suggest that moose populations and distribution are increasing in the Unit.

**HABITAT DESCRIPTION**

Because Unit 3 moose appear to depend on deciduous vegetation in clearcut areas rather than the more persistent riparian or glacial forelands vegetation typical of most Southeast Alaska moose range, it is unclear whether a viable population can be sustained over the long term.

Unit 3 moose habitat consists primarily of old-growth spruce-hemlock forest and clearcut areas. Extensive clearcutting on many of the islands has resulted in early successional vegetation that may temporarily provide good moose browse. No estimate has been made of the amount or quality of moose range in the unit.

**HUMAN-USE HISTORY**

*Regulation History*

From 1960 through 1967 the Unit 3 moose season was open from September 15 through October 15 with a one-bull limit. The season was closed from 1968 until 1990 when the season reopened on Wrangell Island from October 1 through 15, with a one-bull bag limit, a spike-fork or 50" antler restriction, and a harvest ticket requirement. In 1991 the season reopened on Mitkof Island from October 1 through 15 with a one-bull bag limit, a spike-fork or 50" antler restriction, and a harvest ticket requirement. In 1993, the remainder of Unit 3 was opened from October 1 through 15 with a one-bull bag limit, a spike-fork, 3-brow tine or 50" antler restriction, and a registration permit required throughout the unit. From 1995 to present, the season dates have been September 15 through October 15.

Action by the Board of Game effective July 1, 1995 put all of Units 1B and 3 and that portion of Unit 1C south of Point Hobart under a common registration permit hunt (RM038). A legal moose for this hunt is a bull with a spike/fork or 50-inch antlers or 3 brow tines on at least one side.

#### *Historical harvest patterns*

The average annual harvest from 1990 through 1998 was 18 bulls, although during 1990 the season was open only on Wrangell Island, and during 1991 and 1992 the season was opened only on Wrangell and Mitkof islands. Between 1993 (the year the entire unit opened to moose hunting) and 1998, the average annual harvest was 22 bulls.

Unit 3 moose harvest chronology has varied. Most bulls are killed during the first half of the season and the harvest rate declines as the season progresses (Table 2). Most hunters are in the field early in the season, then effort drops except on weekends. Inclement weather does not seem to reduce hunting effort early in the season.

#### *Historical harvest locations*

In 1990, the year the season first opened in Unit 3, moose hunting was restricted to Wrangell Island and 3 bulls were killed. In 1992 and 1993, the season was opened on both Wrangell and Mitkof islands, and a total 10 and 17 bulls were harvested, respectively. Since 1993, the year all of Unit 3 was opened to moose hunting, the majority of moose harvested in the unit have come from Mitkof and Kupreanof islands.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

During the formulation of the Region I moose plan in the late 1980s (ADF&G 1990), we were unaware that by the mid 1990s a moose population would be established in Unit 3 capable of supporting an annual harvest. Harvesting a Unit 3 moose is often opportunistic, and habitat management and road construction will undoubtedly have greater effect on moose numbers and hunting opportunity compared to other factors. We cannot estimate how long Unit 3 habitat will support a viable moose population. The issue of a rebuilding Sitka black-tailed deer populations on the Unit 3 islands compounds the complexity of establishing moose management goals. Moose numbers are presently high enough to support a hunting season in Unit 3, and we intend to continue the hunt as long as it does not affect the integrity of the population. We have established the following draft goals for Unit 3 moose, which includes a crude estimate of the population size, limited knowledge of habitat utilization and moose movements, and anecdotal information from people in the field.

ADF&G first set management objectives for Unit 3 moose in 1996. Prior to that year the harvest was sporadic and we were unsure how persistent the population or harvest would be. After five years when the annual harvest increased from 8 moose to as many as 19 and hunter participation grew from 24 to nearly 400 hunters, we decided some preliminary management objectives were necessary. However, ADF&G has never tried to estimate the Unit 3 moose population by aerial survey because of the difficulty of seeing moose in a mostly forested landscape. Consequently, in succeeding years when harvest and hunter numbers continued to increase it became apparent that

more moose inhabited the islands than was originally thought. Objectives were increased to match the apparent capacity of the herd to sustain the increased harvest and effort.

### Unit 3:

	<u>Plan Objective</u>	<u>1999</u>	<u>2000</u>
Post hunt numbers	400	N/A	N/A
Annual hunter kill	40	26	31
Number of hunters	470	492	504
Hunter-days of effort	2,300	3,194	3,236
Hunter success	10%	5%	6%

## **METHODS**

Hunters and harvested moose were opportunistically checked in the field. Additionally, hunters were required to bring antlers of harvested moose to ADF&G to verify compliance with antler restrictions. Hunters were also required to submit the lower jaw of harvested moose for aging purposes. Since 1997 hunters have been asked to report on their registration permit reports the total number of moose (by sex and age class), wolves, and bears they observed during the hunting season.

## **RESULTS AND DISCUSSION**

Because so little is known about Unit 3 moose – their permanence or their ability to sustain a hunt – objectives have been set at current levels of harvest, effort, and success. ADF&G considers the Unit 3 hunt to be an opportunistic hunt on a population whose permanence is unknown because it relies on atypical habitat. Without information on the current population or habitat-carrying capacity, population objectives are only speculative. Without that information we have supported only hunts with self-limiting regulations (such as spike-fork/50"/3 brow-tine antler restrictions). We believe such hunts enable the population to thrive as permitted by the carrying capacity of the habitat while providing hunting opportunity. Long-term persistence of Unit 3 moose may depend upon a major habitat enhancement program or continued clearcut logging which may be detrimental to deer populations. ADF&G is currently unwilling to take such a pro-active approach. Our current objectives are to “passively manage” the hunt, keeping seasons open as long as moose appear to be abundant, noting harvest and hunter effort, but not actively attempting to increase them.

### **POPULATION STATUS AND TREND**

#### *Population Size*

Data are insufficient to make a quantitative determination of the Unit 3 moose population. We believe Unit 3 moose numbers are at low-to-moderate density and appear to be increasing.

The Unit 3 moose population is the most enigmatic in Southeast Alaska. Numbers, distribution, sex and age ratios, calf-to-cow ratios, and other population characteristics are unknown. No surveys have ever been conducted in Unit 3. Dense forest cover and the lack of any winter

concentration areas make aerial surveys impractical. Harvest data and anecdotal information collected by ADFG wildlife biologists over a period of many years continue to suggest an expanding population. Densities seem to be the greatest on Mitkof and eastern Kupreanof islands. Information is insufficient, however, to accurately estimate moose numbers in the unit. Predators, including wolves and black bears, exist on most islands in the unit, and a few brown bears exist on some islands close to the mainland, but the extent of predation is unknown.

### *Population Composition*

No aerial surveys of moose populations have been conducted in the unit. Information on the number of moose observations reported by hunters on registration hunt report cards provides the only available information on population composition. In 1999, a total of 493 hunters reported observing a total of 1330 moose, including 410 bulls, 584 cows, and 336 calves, for a bull-to-cow ratio of 70:100, and a calf-to-cow ratio of 58:100. In 2000, 504 hunters reported observing a total of 1241 moose, including 454 bulls, 517 cows, and 270 calves, for a bull-to-cow ratio of 88:100, and a calf-to-cow ratio of 52:100.

### *Distribution and Movements*

Moose appear to be expanding their range in Unit 3 despite the lack of deciduous riparian vegetation typical of most moose habitat in the region. Moose have been seen crossing Dry Straits between Farm Island on the Stikine River delta and Mitkof Island. At low tide this strait can be crossed easily and moose are reported to move in both directions. Moose appear to be well distributed on Mitkof, Wrangell, and Kupreanof islands. Moose have become well established, and their numbers appear to be increasing on Etolin, Zarembo, and Kuiu islands.

## **MORTALITY**

### *Harvest*

#### Season and Bag Limit

#### Nonresident and resident hunters

Unit 3

Sept. 15–Oct. 15  
(General hunt only  
except in Stikine Drainage)

1 bull with spike-fork antlers  
or 50-inch antlers or antlers  
with 3 or more brow  
tines on one side by  
registration permit only

Game Board Actions and Emergency Orders. No Board of Game actions were taken or emergency orders issued regarding Unit 3 moose during the report period.

Hunter Harvest. In 1999, 463 hunters harvested 26 moose in Unit 3 (Table 1). In 2000, 473 permittees harvested 31 moose, the highest harvest ever recorded.

Hunter Residency and Success. Almost all Unit 3 moose hunters are local residents from Petersburg, Kake, and Wrangell (Table 4). The overall hunter success rate was 5% in 1999 and 6% in 2000.

Harvest Chronology. In 1999, the largest percentage of the annual harvest occurred during the last and first week of the season. In 2000, the largest percentage of the annual harvest occurred during the first and last weeks of the season.

Harvest in particular WAA's. In both 1999 and 2000, the highest percentage of the annual harvest occurred in WAA # 2007 on Mitkof Island and in WAA # 5132 on Kupreanof Island, respectively.

Guided hunter harvest. No guided moose hunts are currently offered in the Unit.

Transport Methods. Hunters in Unit 3 relied on highway vehicles and boats to reach the field (Table 3).

#### *Other Mortality*

Predation by wolves on adult and calf moose has been reported in Unit 3. Substantial predation of moose calves by black bears has been documented in other areas and probably occurs in Unit 3.

### **HABITAT ASSESSMENT**

#### *Assessment*

Little is known about what constitutes suitable and preferred moose habitat in Unit 3, or if that habitat can sustain a viable moose population over a long period of time. Recent increases in moose distribution and abundance in Unit 3 is likely linked to timber harvest. Early successional clearcuts likely contributed to the increase in moose distribution and abundance by providing temporary increases in browse availability. It is unclear whether moose will persist in Unit 3 as existing clearcuts advance in age and browse availability decreases.

#### *Enhancement*

No habitat enhancement projects specifically intended to benefit moose have been attempted in the unit. Although primarily intended as a silvicultural practice, precommercial thinning and pruning has been performed in some young second growth stands in the unit. These efforts provide a secondary benefit to moose by improving and extending habitat suitability by reducing canopy cover, which permits sunlight to reach the forest floor and increase the production of understory forage plants. These benefits are relatively short-lived, approximately 20–25 years, after which time canopy closure again results in loss of understudy vegetation.

### **NONREGULATORY MANAGEMENT PROBLEMS/NEEDS**

The long-term effects of clearcut logging will likely be detrimental to moose populations. Left untreated, the dense, closed canopy forests characteristic of young, naturally regenerating second-growth conifer stands will reduce moose carrying capacity. The only way to prevent further decline of moose habitat will be to institute additional habitat manipulation procedures.

For genetic or environmental reasons moose in the unit do not exhibit a strong correlation between age and antler configurations, therefore, some modification of the existing antler restrictions may be justified. Moose in the unit rarely achieve 50-inch antler spreads, and the population appears to contain a surplus of illegal bulls in excess of those needed to ensure timely breeding of cows.

## **CONCLUSIONS AND RECOMMENDATIONS**

The Unit 3 moose population appears to have responded favorably to the initial increase in available browse resulting from extensive clearcut logging, but the dense, closed canopy forests caused by the natural regeneration of second-growth stands will eventually decrease the amount of available browse. The loss of habitat and resulting decline in food availability is of concern to biologists and hunters.

In 1999 and 2000, the Unit 3 moose hunt exceeded the objectives for number of hunters and days afield, but the objectives for annual harvest or success rate were not met. The Unit 3 moose population appears to be expanding.

We recommend that for the time being, Units 1B and 3 remain unified under one registration permit with season dates from September 15 through October 15, a one-bull bag limit, and a requirement for spike/fork or 50" antlers or at least 3 brow tines on one antler. Because Unit 3 moose do not display antler characteristics that correlate well with age, some modification of the existing antler restrictions or lengthening of the season may be justified in the future.

## **LITERATURE CITED**

ADF&G. 1990. Strategic plan for management of moose in Region I, Southeast Alaska 1990–1994. ADF&G/DWC. Juneau, Alaska. 120 pp.

### **PREPARED BY:**

Richard E. Lowell  
Wildlife Biologist II

### **SUBMITTED BY:**

Bruce Dinneford  
Regional Management Coordinator

Please cite any information taken from this section, and reference as:

Lowell, R. E. 2002. Unit 3 moose management report. Pages 55–62 *in* C. Healy, editor. Moose management report of survey and inventory activities 1 July 1999–30 June 2001. Alaska Department of Fish and Game. Project 1.0. Juneau, Alaska.

Table 1 Unit 3 moose harvest, regulatory years 1990 through 2000

Year	Hunter harvest reported							
	M	(%)	F	(%)	Unk.	Total	Illegal	Total
1990 <sup>a</sup>	3	(100)	0	(0)	0	3	0	3
1991 <sup>b</sup>	10	(100)	0	(0)	0	10	0	10
1992	17	(100)	0	(0)	0	17	0	17
1993	13	(100)	0	(0)	0	13	0	13
1994	19	(100)	0	(0)	0	19	0	19
1995	13	(100)	0	(0)	0	13	0	13
1996	21	(100)	0	(0)	0	21	3	24
1997	22	(100)	0	(0)	0	20	2	22
1998	40	(100)	0	(0)	0	40	2	42
1999 <sup>c</sup>	24	(100)	0	(0)	0	24	2	26
2000	30	(100)	0	(0)	0	30	1	31

<sup>a</sup> Wrangell Island only.

<sup>b</sup> Wrangell and Mitkof islands.

<sup>c</sup> Includes one DLP.

Table 2 Unit 3 moose harvest chronology in, regulatory years 1993 through 2000

Year	15–21 Sept.	22–28 Sept.	29 Sept.–5 Oct.	6–15 Oct.	Total
1993	0	0	7	6	13
1994	0	0	15	4	19
1995	4	1	5	3	13
1996	9	6	4	5	24
1997	4	7	5	6	22
1998	14	13	7	8	42
1999	7	5	5	9	26
2000	11	7	5	8	31

Table 3 Unit 3 successful moose hunter transport methods, regulatory years 1993 through 2000

Year	Airplane	Boat	Highway vehicle	3/4 wheeler	Horse	Unknown	Total
1993	1	0	12	0	0	0	13
1994	0	3	16	0	0	0	19
1995	1	1	11	0	0	0	13
1996	1	5	17	1	0	0	24
1997	0	8	13	1	0	0	22
1998	0	9	32	0	0	1	42
1999	3	5	17	1	0	0	26
2000	2	6	23	0	0	0	31

Table 4 Unit 3 moose hunter residency and success, regulatory years 1993 through 2000

Year	<u>Successful</u>					<u>Unsuccessful</u>					Total hunters
	Local <sup>a</sup> resident	Nonlocal resident	Non-resident	Total	(%)	Local <sup>a</sup> resident	Nonlocal resident	Non-resident	Total	(%)	
1993	12	1	0	13	(4)	305	15	3	323	(96)	336
1994	18	1	0	19	(5)	351	23	0	374	(95)	393
1995	13	0	0	13	(4)	306	18	0	324	(96)	337
1996	23	1	0	24	(7)	319	10	1	330	(93)	354
1997	22	0	0	22	(6)	329	21	0	350	(94)	372
1998	40	2	0	42	(9)	399	24	1	424	(91)	466
1999	26	0	0	26	(5)	429	32	2	463	(95)	492
2000	27	4	0	31	(6)	435	33	5	473	(94)	504

<sup>a</sup> Residents of Kake, Petersburg, and Wrangell.



## **MOOSE MANAGEMENT REPORT**

From: 1 July 1999

To: 30 June 2001

### **LOCATION**

**GAME MANAGEMENT UNIT:** 5 (5,800 mi<sup>2</sup>)

**GEOGRAPHICAL DESCRIPTION:** Cape Fairweather to Icy Bay, eastern Gulf of Alaska coast

### **BACKGROUND**

Moose were first documented along the lower Alsek River in eastern Game Management Unit 5 (Unit 5) in the late 1920s or early 1930s. Range expansion to the west followed, with animals documented on the Malaspina Forelands west of Yakutat Bay by the 1950s. It is believed that the glaciers and waters of Icy Bay curtailed westward movement of this moose population.

The moose population in Unit 5 grew rapidly and peaked in the early 1960s, with population estimates exceeding 2,000 animals. The population began declining toward a more realistic carrying capacity in the mid 1960s. Poor reproductive success and severe winters in 1970 and 1972 depressed moose numbers enough that Unit 5A hunting seasons were closed from 1974–1977. Since 1978 Unit 5 moose hunting has been managed under a registration permit system.

In 1991 a federal subsistence season was instituted, and ran concurrently with the state season until 1996. This federal season restricted hunting on federal public lands to local resident hunters during the first week of the season. In 1996 the Federal Subsistence Board lengthened the federal season by one week, starting it one week earlier than the state season. Although the concurrent seasons had been managed under the state's registration permit system, the new "early hunt" has been administered under a separate federal registration permit issued by the U. S. Forest Service (USFS) and the National Park Service, and prohibits hunting on federal public lands except by Yakutat residents from October 15 through October 21. Although there is a block of 9 townships of non-federal land near Yakutat where nonlocals can legally hunt during the first week of the state season that begins on October 15, local residents have always harvested the majority of moose taken on the Yakutat Forelands before October 22. Additionally they take the majority of moose killed west of the Dangerous River during the entire season (Table 4).

### **MANAGEMENT DIRECTION**

#### **MANAGEMENT OBJECTIVES**

The following objectives based on existing biological data have been identified by staff with input from the public and are contained in the Strategic Plan for Management of Moose in Region I, Southeast Alaska (ADF&G, 1991). They are compared with current population estimates and use levels (these estimates include data from both state and federal hunts).

	<b>Current report period means (1999–2000)</b>	<b>Plan objective</b>
<b>Unit 5A Yakutat Forelands</b>		
Post-hunt moose numbers	800	1,000
Annual hunter kill	39	70
Number of hunters (annually)	130	250
Hunter–days of effort (annually)	550	1,025
Hunter success (annual)	30%	28%
<b>Unit 5A Nunatak Bench</b>		
Post-hunt moose numbers	54	50
Annual hunter kill	1.5	5
Number of hunters (annually)	6	10
Hunter–days of effort (annually)	28	60
Hunter success (annual)	25%	50%
<b>Unit 5B Malaspina Forelands</b>		
Post-hunt moose numbers	200	250
Annual hunter kill	9	25
Number of hunters	19	50
Hunter–days of effort	93	200
Hunter success	47%	50%

## **METHODS**

Aerial surveys of parts of Units 5A and B were conducted during both years of the report period. All surveys were conducted with Cessna 185 aircraft. The preferred survey aircraft, such as a Supercub that has a lower stall speed and allows observers the ability to see and accurately identify moose sex and age classes, was not available in Yakutat. Ages of harvested moose were determined from incisors submitted by hunters under terms of the registration permit. Other data collected included the number of days hunted, hunter residency, kill date and location, and transport type. Information from federal permits was collected for successful hunters, but was not available for most unsuccessful hunters.

## **RESULTS AND DISCUSSION**

### **POPULATION STATUS AND TREND**

After the hunting closures in the mid 1970s, the Yakutat Forelands moose population slowly increased to where it may now be near the habitat's carrying capacity. Aerial surveys suggest this population has been static since the mid 1980s. The Nunatak Bench area was closed to hunting after rising water levels from a glacial ice dam flooded much of the moose habitat there in summer 1986. Following the retreat of the Hubbard Glacier and the subsidence of the waters of Russell Fiord in fall 1986, brushy vegetation recolonized the shoreline and moose reoccupied this range. Based on 1994 surveys, the Board of Game (BOG) reopened moose hunting in this area beginning with the 1995 season. The Unit 5B (Malaspina Forelands) moose population appears healthy at moderate densities. Anecdotal evidence from Yakutat residents suggests that the brown bear and wolf populations in Unit 5B keep this moose herd in check.

Population Size. Aerial surveys were conducted of the Yakutat Forelands during regulatory year 2000, and at Nunatak Bench and the eastern portion of Unit 5B in 1999. In the Yakutat and Malaspina forelands, where the heavy coniferous forest makes it difficult to detect moose, we assume a moose sightability of about 50% (Smith and Franzman, 1979). Nunatak Bench lacks coniferous stands, resulting in much higher sightability.

We counted 365 moose on the Yakutat Forelands during a February 2001 survey (Table 1). Based on this survey, we estimate that the forelands moose population is 600–800 animals. Surveys lasted 25% longer than the previous survey in 1999, while the sighting rate declined from 56 moose per hour to 40 moose per hour. This is still comparable to the long-term sighting rate of 45 moose per hour since 1990. It is important to look critically at this moose-per-hour data by examining the survey areas as well as the time spent surveying. Longer survey times over the past 10 years correspond to lower sighting rates; this is probably due to a wider survey area including areas away from moose concentrations, thereby lowering sighting rates.

At Nunatak Bench we counted 33 moose during a 1999 survey and 54 in 2000. The 2000 count was the highest ever recorded for the area (Table 1), and probably represents a high proportion of the population.

In Unit 5B a partial survey was conducted in 1999 while in 2000 about 90% of the area was surveyed. The count of 113 animals in 2000 was the highest since 1982, but probably represents only a portion of the moose present. We estimate the moose population in 5B to be 200–250 animals.

Given the wide range of survey intensity from year to year, perhaps the best gauge of moose numbers is the number of moose observed per hour of survey time (Table 1).

Population Composition. We were unable to obtain composition data during this report period for any Unit 5 moose populations (Table 5). February 2000 surveys provided general population information, but they were not reliable for sex or age composition because they occurred after antler drop. In addition, we spent minimal time identifying calves, so calf numbers are unreliable.

Age at harvest of Yakutat Forelands moose has ranged from 2.2 years to 3.9 years since 1984 (Table 2). Mean age at harvest increased from 2.8 during the previous report period to a mean of 3.5 years during 1999–00. From 1994–1998, 34% of the bulls harvested were age 1.5 (Table 2). This age class dropped dramatically during the current report period and made up only 15% of the bulls harvested. In contrast to the relatively consistent age of moose harvested in Unit 5A, the mean age of harvested Malaspina Forelands moose has been erratic, ranging between 2.7 and 5.4 years since 1990. The limited access and resultant lower hunting pressure on the Malaspina Forelands probably allows bulls to reach an older age than those on the Yakutat Forelands (Table 2). Also, we are dealing with a smaller sample size of harvested moose in 5B. In spite of this, the distribution of ages of harvested animals in Unit 5B does not appear to follow any pattern.

The low moose harvest at Nunatak Bench has not allowed us to gather any meaningful age distribution information.

## **MORTALITY**

### *Harvest*

#### Season and bag limits

Unit 5A, except Nunatak Bench

1 bull by registration permit only; up to 60 bulls may be taken; the commissioner may close the season in that portion west of the Dangerous River when 30 bulls have been taken from that area

#### Resident and nonresident hunters

Oct. 15–Nov. 15

Unit 5A, Nunatak Bench

Nov. 15–Feb. 15

1 moose by registration permit only; up to 5 moose may be taken

Unit 5B

Sept. 1–Dec. 15

1 bull by registration permit only; up to 25 bulls may be taken

Game Board Actions and Emergency Orders. There were no emergency orders issued regarding Unit 5 moose hunting during the report period. This was a change from the previous report period when, for both 1997 and 1998, Unit 5A west of the Dangerous River was closed prior to the scheduled season closing date.

Hunter Harvest. Harvest throughout Unit 5 remained relatively constant since 1988, with a total of 57–77 moose taken annually, but that changed during this report period. In 1999 only 41 moose were harvested, and the harvest declined to 37 in 2000 (Table 3). The reasons for this decline are not clear, although hunter effort, foul weather, and some loss of moose from heavy snows during the winter of calendar 1999 are likely factors. We cannot determine if there was a decline in hunter effort during this report period due to missing federal permit information. In the state hunt a mean of 130 permittees hunted during 1999 and 2000, compared to 168 per year during the previous 6 years; this lower effort contributed to fewer animals being taken. In addition, the weather during both years was extremely foul, with heavy rains falling during most of the season. These conditions hindered hunters' efforts, and pushed moose out of meadows they normally frequent during the fall, into higher, densely forested areas (Neil Barten pers. comm.). And lastly, it is likely that the heavy snows from the winter of 1999 caused some mortality to the bull population.

The harvest of 3 moose at Nunatak Bench was equivalent to the previous report period. All animals were taken in 2000 (Table 3). In Unit 5B, 18 moose were harvested during the report period compared to 23 during 1997–1998. This difference can be attributed somewhat to the lower hunting effort during 1999–2000 (Table 3).

Permit Hunts. The total number of permits (both state and federal) issued for the Yakutat Forelands hunt (RM061) reached 300 in 1997 and 303 in 1998, in part due to Yakutat residents

obtaining both permits (Table 5). This caused considerable confusion for ADF&G personnel when tabulating hunting effort. During this report period we were unable to gather federal permit information, so the effort listed in Table 5 is from state permits only and should be considered well below actual hunting effort. In 1999, 114 of 157 permittees hunted moose, and 41 were successful. In 2000, 146 of 173 permittees harvested 37 moose, and one federal ceremonial moose was harvested for a potlatch. The Nunatak Bench hunt (RM059) received more than twice the hunting effort (12 hunters vs. 5) than the previous two-year period, but the number of moose harvested was identical at 3. Difficult access to this area makes it a very challenging place to hunt, and few people are willing to even attempt a hunt at Nunatak.

The Unit 5B hunt (RM062) also received less hunting pressure during this report period (36 hunters) compared to the previous two years (53 hunters). The harvest reflected this lower effort with only 18 bulls being taken compared to 23 during 1997–1998.

Staff from the Department of Public Safety/Division of Fish and Wildlife Protection and both ADF&G fisheries divisions continued to assist with permit issuance and monitoring of these permit hunts. Enforcement personnel from the USFS also helped monitor the Unit 5A hunt during the report period. Reminder cards and certified letters were used to increase compliance with reporting requirements for the state permit hunts. The federal permit process complicates matters as some hunters pick up both a state and a federal permit, while other hunters get one or the other. In addition, the federal hunt reporting requirements are not as stringent as ours, in that delinquent hunt reports are not pursued.

Hunter Residency and Success. Local residents hunt primarily in Unit 5A on the Yakutat Forelands (Table 4). Beginning with state regulations in 1987, local residents were able to hunt the first week of the season before it opened to nonlocal hunters. In 1991, federal subsistence regulations allowed local residents exclusive hunting rights on federal lands for the first week of the concurrent state and federal seasons. The 1996 implementation of a federal season preceding the state season by one week has further enhanced opportunity for local hunters. The first portion of the moose hunt traditionally accounts for a majority of the 5A harvest, and since most easily accessible land is under federal management, harvest by Yakutat residents predominates. Local hunters took 66% of the bulls harvested in Unit 5A in 1999 and 73% in 2000. The majority of moose taken by local hunters were taken during the first two weeks of the season. Later in the season, use increased by non-local hunters in areas farther from Yakutat (especially east of the Dangerous River) and in those accessible only by airplane. Nonlocal Alaskans hunting in Unit 5A took 11 moose (27% of bulls taken under registration permits) in 1999 and 8 (22%) in 2000. Most nonlocal Alaska hunters are from Juneau. Nonresidents took 3 moose in Unit 5A during the 1999 season and 2 in 2000 (Table 4).

Since 1986 the overall success of Unit 5A hunters has ranged from 19 to 32 percent (Table 3). 1999 hunter success was 35%, then 25% in 2000. The average number of days expended by Yakutat Forelands hunters reached an all time high in 1993 (Table 5), returned to historic levels during the 1997–1998 report period, then climbed back to the near record level during 2000. Care should be taken in interpreting these data without first incorporating federal hunt information.

Hunting effort expended at Nunatak Bench during the report period was substantially higher than the previous report period (28 hunter days for 12 hunters during 1999–2000 vs. 10 days for 5 hunters during 1997–1998). However, hunter success during this report period was only 25% compared to 60% during the previous two years. Nonlocal Alaskans took two of 3 moose harvested, although traditionally this hunt only attracts local hunters (Table 4).

The Malaspina Forelands hunt is less dominated by local use, as it is less convenient to hunt and inclement weather often deters local hunters from short excursions to this area. Local residents took 4 of 18 moose (22%) harvested during the report period, compared to 35% during the previous 2 years. Nonlocal state residents killed 4 of the moose during the report period, while nonresidents took the largest portion at 10 animals (56%). All nonresident hunters were guided.

Harvest Chronology. Moose harvest from Unit 5 early in the state season is relatively low, partly because only Unit 5B is open from September 1 through October 14 (Table 4), and this area typically accounts for only a small portion of the total Unit 5 harvest. Most of the Unit 5 harvest takes place during the first weeks of the 5A season, when areas adjacent to Yakutat and easily accessible by boat or highway vehicle are first open. Most of the harvest on the Yakutat Forelands took place during the first part of the state season, but unlike the previous report period the guideline harvest was not reached during either year and the season remained open until the scheduled closing date of November 15. Moose were harvested throughout the latter part of the season, but in small numbers.

Two of 3 moose taken at Nunatak Bench were harvested in November and the third was taken in January. Most moose harvested in this area are taken in January or February when they are nearer the beach and easier to access, and when days lengthen, allowing for more hunting opportunity. The Malaspina Forelands harvest is generally concentrated during the latter part of September and early October. This was the case during this report period, largely the result of nonresident hunting coincident with the beginning of the rut.

Transport Methods. Transport methods used during the current report period differed from the previous report period (Table 6). Although aircraft continue to be the most popular transportation method among successful hunters (37%), the use of highway vehicles (29%) surpassed boats (22%) as the next most popular method. Three and 4-wheelers accounted for 14% of the transportation used, and are probably underrepresented, as some hunters reporting “other” probably used off-road vehicles. Many unsuccessful hunters also use these machines for access. Habitat impacts, wounding loss, animal harassment, and fair chase ethics due to the use of 3- and 4-wheelers concern wildlife managers. Virtually every fish camp has one or more of these machines present, and although these off-road vehicles have been used in Yakutat for many years more hunters seem to be using them in a less incidental fashion and more as a primary method of access. These machines are commonly used to drag whole moose from a kill site to the nearest road. Rutted meadows from wheeled vehicles are now a common sight in Unit 5A.

Despite the importance of aircraft for hunter transportation, relatively few Yakutat residents use them. Most locals hunt with the aid of riverboats, ATV’s, or highway vehicles, while most non-resident hunters charter aircraft for access. The use of aircraft generally increases later in the season as non-local hunters begin hunting in non-roaded portions of the unit.

Commercial Services. Commercial services were used by 18% of Unit 5 moose hunters during the report period (Table 7). Nonlocal hunters were more likely to use commercial services, with

transport to the field being used the most. Commercial services were used by a higher percentage of Unit 5B hunters than in Unit 5A. This undoubtedly reflects the fact that the Malaspina Forelands are more difficult to access.

Other Mortality. One male, one female, and one moose of unidentified sex were harvested under federal ceremonial permits, and one male and one female were taken under state ceremonial permits during the report period. This represents a 50% decline in the federal ceremonial harvest from the previous report period, but an increase from zero to three in the state ceremonial harvest.

The winter of 1998–1999 was severe, with deep snow persisting until late May on much of Unit 5. Anecdotal information from a local pilot suggests that many moose succumbed to wolf and bear predation during late winter and spring.

Habitat. ADF&G staff undertook no habitat assessment or enhancement procedures during the period.

## **CONCLUSIONS AND RECOMMENDATIONS**

Complete fall sex and age composition counts of all Unit 5 moose herds need to be conducted. Age data on harvested moose should continue to be collected and carefully scrutinized.

Most management goals for Unit 5 moose hunts were not met during this report period. For example, although management goals regarding hunter success were attained during 1997 for the Yakutat Forelands (RM061) as well as the Nunatak Bench hunt (RM059), they were not reached in 1998 for either hunt (Table 3). This trend is mirrored for hunter success on the Malaspina Forelands, which was 45% and 42% in 1997 and 1998, respectively, both below the objective of 50% (Table 3). Hunter effort was below management objectives for all hunts, although for the Malaspina Forelands and the Nunatak Bench hunts, this is related primarily to difficult access.

### **PREPARED BY:**

Neil L. Barten  
Wildlife Biologist III

### **SUBMITTED BY:**

Bruce Dinneford  
Management Coordinator

Please cite any information taken from this section, and reference as:

Barten, N. L. 2002. Unit 5 moose management report. Pages 63-76 in C. Healy, editor. Moose management report of survey and inventory activities 1 July 1999–30 June 2001. Alaska Department of Fish and Game. Project 1.0. Juneau, Alaska.

Table 1 Unit 5 aerial survey data, regulatory years 1984 through 2000

Year	MM	FF	Calves	Unk	Total	Count time (hrs)	MM Per 100 FF	Calves per 100 FF	Percent calves in herd	Moose per hour
<u>5A Yakutat Forelands</u>										
1984	90	229	60	---	379	12.1	39	26	16	31
1985	50	168	41	---	259	11.0	30	24	16	24
1986	34	166	60	---	260	11.3	20	36	23	23
1987	---	---	83	---	322	11.2	---	---	26	29
1988	91	339	85	---	515	10.3	27	25	17	50
1989						No survey				
1990	43	309	93	---	445	6.8	14	30	21	66
1991 <sup>1</sup>	---	---	---	---	204	8.0	---	---	---	26
1992	---	---	37	---	196	5.9	---	---	19	33
1993 <sup>2</sup>	---	---	---	---	219	6.3	---	---	---	35
1994 <sup>3</sup>	51	124	51	158	397	9.3	20	32	21	41
1995	14	71	78	303	466	8.5	---	---	17	55
1996	10	68	8	---	86	1.9	15	12	9	45
1997						No survey				
1998	7	17	17	333	374	6.7	---	---	---	56
1999						No survey				
2000	1	10	11	343	365	9.1	---	---	---	40
<u>5A Nunatak Bench</u>										
1984	10	13	4	---	27	0.5	77	31	15	54
1985						No survey				
1986	5	4	1	---	10	0.5	125	25	10	20
1987–1993						No survey				
1994	3	18	---	---	25	0.3	16	22	16	75
1995	5	6	6	16	33	0.3	---	---	18	110
1996–1998						No survey				
1999	---	---	---	33	33	0.4	---	---	---	83
2000	---	1	1	52	54	0.8	---	---	---	69
<u>5B Malaspina Forelands</u>										
1981 <sup>4</sup>	21	88	25	---	134	3.1	24	28	19	43
1982	26	103	16	---	145	8.4	25	16	11	17
1983	---	---	21	---	66	1.8	---	---	32	37
1984–1986						No surveys				
1987 <sup>5</sup>	---	---	14	---	69	2.8	---	---	20	25
1988–1994						No surveys				
1995	4	10	11	84	109	1.75	---	---	10	62
1996–1998						No surveys				
1999	---	---	---	38	38	0.8	---	---	---	48
2000	---	2	3	108	113	2.2	---	---	---	51

<sup>1</sup> NPS survey using a PA-18, from 3/1 to 3/5, 1991, from the mouth of the Doame River northwest to the Dangerous River.

<sup>2</sup> USFS survey using a C-185 done from 2/14 to 2/17, 1994, between Yakutat and Dry Bay.

<sup>3</sup> Age and sex ratios reflect flights made in a PA-18 (5.5 hrs. from 12/2 to 12/3, 1994); total numbers include flights in both PA-18 and C-185 (3.62 hrs. from 12/6 to 12/7, 1994).

<sup>4</sup> Bancas Point to Sitkagi Bluffs only.

<sup>5</sup> Sex and age ratios unreliable.



Table 2 Unit 5 age structure of harvested moose, regulatory years 1984 through 2000

Year	0.5	1.5	2.5	3.5	4.5	5.5	6.5	Age 7.5	Class 8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	Total kill	% Aged	Mean Age
<u>Yakutat Forelands</u>																			
1984	2	13	11	6	7	3	2	3	0	0	0	0	0	0	0	0	49	96	3.2
1985	1	15	10	10	2	1	3	1	0	1	1	1	0	0	0	0	46	100	3.4
1986	3	10	13	8	4	9	3	1	0	2	0	0	0	0	0	0	54	98	3.6
1987	1	14	7	3	7	2	1	0	1	0	0	0	0	0	0	0	38	95	3.0
1988	0	17	16	5	2	3	1	0	1	0	1	0	0	0	0	0	47	98	2.9
1989	0	10	16	7	5	4	0	1	0	0	0	0	0	0	0	0	45	96	3.1
1990	0	16	18	14	4	3	2	0	0	0	0	0	0	0	0	0	57	100	2.9
1991	0	20	18	7	4	1	0	1	1	0	0	0	0	0	0	0	52	100	2.7
1992	0	13	5	5	3	1	2	1	0	0	0	0	0	0	0	0	50	60	3.0
1993	0	12	7	14	3	2	1	2	1	0	0	0	0	0	0	0	50	84	2.8
1994	0	23	8	6	5	4	0	3	2	1	0	1	0	0	0	0	60	90	2.9
1995	0	20	12	4	2	3	1	0	1	0	0	0	0	0	0	0	45	96	2.2
1996	0	19	12	9	5	2	5	1	0	2	0	0	0	0	0	0	60	92	2.8
1997	1	22	18	8	4	3	1	0	2	0	1	0	0	1	0	0	61	97	2.7
1998	1	15	11	10	6	2	4	1	0	2	0	0	0	0	0	0	55	95	2.9
1999	0	6	15	6	7	0	2	1	0	0	0	0	0	0	0	0	41	90	3.2
2000	0	6	6	9	7	3	2	2	1	0	0	0	0	0	0	0	37	97	3.9
<u>5A Nunatak Bench</u>																			
1995	No age data																		
2000	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	100	5.0
<u>5B Malaspina Forelands</u>																			
1990	0	5	2	3	2	1	0	1	0	0	0	0	0	0	0	0	14	100	3.2
1991	0	3	3	1	2	2	1	0	3	0	0	0	0	0	0	0	17	88	4.5
1992	0	0	5	0	0	0	0	1	0	0	0	0	0	0	0	0	7	86	3.3
1993	0	2	4	3	3	0	1	0	0	0	0	0	0	0	0	0	15	87	2.8
1994	0	0	0	1	3	1	1	0	1	0	0	0	0	0	0	0	7	100	4.9
1995	0	2	5	1	3	0	0	0	1	0	0	0	0	0	0	0	12	100	2.9
1996	0	1	2	1	2	3	1	0	0	2	1	1	0	0	0	0	16	88	5.4
1997	0	1	2	3	1	0	0	1	2	0	0	0	0	0	0	0	13	77	4.1
1998	0	1	3	3	2	0	0	0	0	0	0	0	0	0	0	0	10	90	2.7
1999	0	1	1	1	2	0	1	1	0	0	0	0	0	0	0	0	7	100	4.4
2000	0	1	1	5	1	0	0	0	1	0	0	0	0	0	0	0	11	82	3.8

Table 3 Unit 5 historical harvests, hunters, and success, regulatory years 1984 through 2000

Year	Nr MM	Nr FF	Nr unk.	Total kill	Nr hunters	Percent success
<u>5A Yakutat Forelands</u>						
1984	49	0	0	49	230	21
1985	46	0	0	46	129	36
1986	54	0	0	54	198	27
1987	38	0	0	38	199	19
1988	47	0	0	47	153	31
1989	45	0	0	45	163	28
1990	57	0	0	57	178	32
1991	52	0	0	52	175	30
1992	50	0	0	50	199	25
1993	50	1 <sup>1</sup>	0	51	204	25
1994	60	1 <sup>1</sup>	0	61	208	29
1995	48 <sup>2</sup>	2	0	50	185	24
1996	60	1	0	61	190	32
1997	59	1	1	61	194	30
1998	54	1	0	55	195	27
1999	41	1	0	42	114	35
2000	37	0	0	37	146	25
<u>5A Nunatak Bench</u>						
1984	3	3	0	6	14	43
1985	2	0	0	2	3	67
1986–1994	Season closed					
1995–1996	No moose harvested					
1997	2	0	0	2	2	100
1998	0	1	0	1	3	33
1999	0	0	0	0	5	0
2000	2	1	0	3	7	43
<u>5B Malaspina Forelands</u>						
1984	15	0	0	15	50	30
1985	13	0	0	13	62	21
1986	9	0	0	9	34	26
1987	8	0	0	8	34	24
1988	11	0	0	11	40	28
1989	12	0	0	12	44	27
1990	14	0	0	14	49	40
1991	17	0	0	17	39	44
1992	7	0	0	7	25	28
1993	15	0	0	15	31	48
1994	7	0	0	7	26	27
1995	12	0	0	12	28	43
1996	16	0	0	16	31	52
1997	13	0	0	13	29	45
1998	10	0	0	10	24	42
1999	7	0	0	7	12	58
2000	11	0	0	11	26	42

<sup>1</sup> Illegal kills not included in the calculation of hunter success.<sup>2</sup> Includes 3 bulls harvested under ceremonial permits; not included in hunter success ratios.

Table 4 Unit 5 annual moose kill by community of residence, regulatory years 1984 through 2000

Year	Total kill	Yakutat	Juneau	Ketchikan	Sitka	Pelican	Hoonah	Petersburg	Haines	Wrangell	Other AK	Non-resident
<u>5A Yakutat Forelands</u>												
1984	49	18	16	2	6	0	2	1	0	1	1	2
1985	44	28	13	0	3	0	0	0	0	0	0	0
1986	54	22	16	1	4	1	3	0	4	0	2	1
1987	38	27	7	0	1	0	0	0	0	0	2	1
1988	47	38	6	0	0	0	1	0	0	0	1	1
1989	45	40	2	0	1	0	0	0	0	0	2	0
1990	50	45	11	1	0	0	0	0	1	0	3	2
1991	52	28	15	0	2	0	0	0	1	0	5	2
1992	50	32	7	0	0	3	0	0	3	0	2	3
1993	50	31	11	0	3	1	0	0	0	0	2	2
1994	60 <sup>1</sup>	38	14	1	0	2	0	0	0	0	3	2
1995	50 <sup>2</sup>	35	14	0	0	1	0	0	0	0	0	0
1996	60	45	7	0	1	0	0	0	0	0	3	4
1997	61	45	13	0	0	1	0	0	0	0	1	1
1998	55	38	10	0	0	0	0	0	0	0	4	3
1999	41	27	10	0	0	0	0	0	0	0	1	3
2000	37	27	7	0	0	0	0	0	0	0	1	2
<u>5A Nunatak Bench</u>												
(No Data)												
1984–1996												
1997	2	2	0	0	0	0	0	0	0	0	0	0
1998	1	1	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	3	1	0	0	0	0	0	2	0	0	0	0
<u>5B Malaspina Forelands</u>												
1984	15	5	1	6	0	0	0	0	0	0	0	3
1985	13	8	2	1	0	0	1	0	0	0	1	0
1986	9	3	2	0	0	0	0	0	0	0	0	4
1987	8	5	1	0	0	0	0	0	0	0	0	2
1988	11	5	3	1	1	0	0	0	0	0	1	0
1989	12	7	2	1	0	0	0	0	0	0	1	1
1990	14	9	3	0	0	0	0	0	0	0	1	1
1991 <sup>3</sup>	17	7	4	1	0	0	0	0	0	0	3	1
1992	7	4	3	0	0	0	0	0	0	0	0	0
1993	15	3	2	1	0	0	0	0	0	0	0	9
1994	7	3	2	0	0	0	0	0	0	0	1	1
1995	12	4	3	0	1	0	0	0	0	0	0	4
1996	16	6	2	0	0	0	1	0	1	0	0	6
1997	13	4	1	0	0	0	0	0	0	0	1	7
1998	10	4	2	0	0	0	0	0	0	0	0	4
1999	7	2	0	0	0	0	0	0	0	0	0	5
2000	11	2	2	0	1	0	0	0	0	0	1	5

<sup>1</sup> Does not include one known illegal kill. <sup>2</sup> Includes 5 moose harvested under ceremonial permits, 3 bulls and 2 cows. <sup>3</sup> Includes one kill by hunter of unknown residency.

Table 5 Unit 5 hunter effort and success, regulatory years 1990 through 2000<sup>1</sup>

Year	Successful hunters			Unsuccessful hunters			Total hunters			
	Permits issued	Nr hunters	Total days	Avg. days	Nr hunters	Total days	Avg. days	Nr hunters	Total days	Avg. days
<u>5A Yakutat Forelands</u>										
1984	---	49	132	2.7	181	978	5.4	230	1110	4.8
1985	---	44	117	2.7	84	457	5.4	128	574	4.6
1986	---	54	171	2.7	143	696	4.9	197	867	3.6
1987	---	38	109	2.9	161	948	5.9	199	1057	5.6
1988	206	47	95	2.0	106	281	2.7	153	376	2.4
1989	213	45	107	2.4	118	620	5.3	163	727	4.3
1990	213	57	110	1.9	122	497	4.2	178	607	3.5
1991	236	52	162	3.1	123	425	3.4	175	587	3.6
1992	238	50	130	2.6	149	771	6.0	199	901	4.5
1993	239	50	204	4.1	154	979	6.5	204	1183	5.9
1994	268	60	167	2.9	148	712	4.8	208	879	4.4
1995	245	45	99	2.3	140	471	3.4	185	570	3.1
1996	277	60	147	2.6	76	427	3.6	190	574	3.0
1997	300	59	154	2.8	110	453	4.1	194	607	3.1
1998	303	52	102	2.0	135	373	2.8	195	475	2.4
1999	157	41	101	2.5	73	282	4.2	114	383	3.6
2000	173	37	92	2.6	108	626	6.0	146	718	5.2
<u>5A Nunatak Bench</u>										
1984	---	6	27	4.5	8	24	3.0	14	51	3.6
1985	---	2	44	22.0	1	10	10.0	3	32	10.7
1986–1994	Season Closed									
1995	19	0	0	0	3	3	1.0	3	3	1.0
1996	9	0	0	0	3	4	1.3	3	4	1.3
1997	10	2	3	1.5	0	0	0	2	3	1.5
1998	11	1	2	2.0	2	5	2.5	3	7	2.3
1999	12	0	0	0	5	14	3.5	5	14	3.5
2000	14	3	6	2.0	4	8	2.0	7	14	2.0
<u>5B Malaspina Forelands</u>										
1984	---	15	40	2.7	40	191	4.8	55	231	4.2
1985	---	13	34	2.6	49	226	4.6	62	260	4.2
1986	---	9	40	4.4	27	139	5.1	36	179	5.0
1987	---	8	56	2.8	16	83	5.2	24	139	5.8
1988	58	11	39	3.5	29	120	4.1	40	159	4.0
1989	65	12	47	3.9	32	143	4.7	44	190	4.3
1990	60	14	53	3.8	35	80	2.4	49	133	2.8
1991	60	17	51	3.0	22	90	4.5	39	141	3.8
1992	52	7	22	3.1	18	61	3.4	25	83	3.3
1993	54	15	30	2.0	16	91	5.7	31	121	3.9
1994	42	7	109	15.6	19	26	1.9	26	135	6.4
1995	56	12	46	3.8	15	57	3.8	27	103	3.8
1996	55	16	71	4.4	14	75	5.4	30	146	4.9
1997	48	13	44	3.4	16	62	4.8	29	106	4.1
1998	43	10	44	4.4	14	63	4.5	24	107	4.6
1999	37	7	36	5.1	5	25	6.3	12	61	5.5
2000	46	11	54	4.9	15	71	5.1	26	125	5.0

<sup>1</sup> Not all information is available for each hunter; calculations for any given field may only include a subset of hunters.

Table 6 Unit 5 transport methods used by successful hunters, regulatory years 1990 through 2000<sup>1</sup>

Year	<u>Airplane</u>		<u>Boat</u>		<u>3 or 4 wheeler</u>		<u>ORV</u>		<u>Highway vehicle</u>		<u>Foot</u>	
	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
<u>5A Yakutat Forelands</u>												
1990	29	(51)	10	(18)	7	(12)	0	---	11	(19)	0	---
1991	29	(56)	6	(12)	7	(13)	0	---	10	(19)	0	---
1992	22	(44)	8	(16)	9	(18)	0	---	11	(22)	0	---
1993	25	(50)	12	(24)	6	(12)	0	---	5	(10)	2	(4)
1994	24	(41)	15	(25)	9	(15)	0	---	9	(15)	2	(3)
1995	15	(37)	11	(27)	9	(23)	1	(3)	4	(10)	0	---
1996	13	(22)	15	(26)	10	(17)	0	---	16	(28)	4	(7)
1997	17	(44)	6	(16)	4	(11)	0	---	11	(29)	0	---
1998	16	(29)	15	(28)	8	(15)	0	---	15	(28)	0	---
1999	10	(32)	15	(48)	0	---	0	---	6	(19)	0	---
2000	12	(44)	11	(41)	0	---	0	---	4	(15)	0	---
<u>5A Nunatak Bench</u>												
1995	0	---	0	---	0	---	0	---	0	---	0	---
1996	0	---	0	---	0	---	0	---	0	---	0	---
1997	0	---	2	(100)	0	---	0	---	0	---	0	---
1998	0	---	1	(100)	0	---	0	---	0	---	0	---
1999	1	(25)	3	(75)	0	---	0	---	0	---	0	---
2000	0	---	7	(100)	0	---	0	---	0	---	0	---
<u>5B Malaspina Forelands</u>												
1990	9	(69)	4	(31)	0	---	0	---	0	---	0	---
1991	14	(82)	2	(12)	0	---	1	(6)	0	---	0	---
1992	5	(100)	0	---	0	---	0	---	0	---	0	---
1993	12	(80)	0	---	3	(20)	0	---	0	---	0	---
1994	5	(71)	2	(29)	0	---	0	---	0	---	0	---
1995	8	(89)	0	---	0	---	1	(11)	0	---	0	---
1996	8	(58)	1	(7)	3	(21)	0	---	0	---	2	(14)
1997	3	(22)	4	(31)	4	(31)	1	(8)	0	---	1	(8)
1998	6	(60)	1	(10)	3	(30)	0	---	0	---	0	---
1999	2	(29)	1	(14)	4	(57)	0	---	0	---	0	---
2000	9	(82)	0	---	2	(18)	0	---	0	---	0	---

<sup>1</sup> Not all information is available for each hunter; calculations for any given field may only include a subset of hunters.

Table 7 Unit 5 commercial services used by hunters, regulatory years 1991 through 2000<sup>1</sup>

Year	Unit residents		Other AK residents		Nonresidents		Total use		Transport	Registered guide	Other Services
	No	Yes	No	Yes	No	Yes	No	Yes			
5A Yakutat Forelands											
1991	11	7	0	13	0	3	11	23	19	2	2
1992	123	8	40	17	5	1	168	26	22	0	4
1993	122	11	26	18	3	2	151	31	28	2	1
1994	131	9	26	24	0	0	157	33	32	1	0
1995	111	9	21	26	3	3	135	38	36	1	0
1996	44	1	16	18	4	2	64	21	19	1	1
1997	67	5	21	13	4	7	92	24	22	1	2
1998	101	1	18	17	7	5	126	23	18	3	1
1999 <sup>2</sup>											
2000 <sup>2</sup>											
5A Nunatak Bench											
1995	3	0	----	----	----	----	3	0	----	----	----
1996	3	0	----	----	----	----	3	0	----	----	----
1997	2	0	----	----	----	----	3	0	----	----	----
1998	3	0	----	----	----	----	3	0	----	----	----
1999	2	0	4	0	----	----	6	0	0	0	0
2000	3	0	3	0	----	----	6	0	0	0	0
5B Malaspina Forelands											
1991	1	4	0	9	0	0	1	13	9	0	4
1992	2	3	3	5	0	4	5	12	5	7	0
1993	1	5	6	7	0	7	7	19	13	6	0
1994	6	0	0	8	1	1	7	9	8	1	0
1995	6	9	1	5	3	4	10	18	15	2	1
1996	3	1	2	9	0	9	5	19	11	8	1
1997	1	3	0	1	0	5	1	9	3	5	0
1998	3	1	0	2	3	4	6	7	4	5	0
1999	3	1	0	0	0	5	3	6	1	5	0
2000	2	3	2	3	0	14	4	20	6	14	0

<sup>1</sup> Not all information is available for each hunter, therefore the calculations for any given field may only include a subset of hunters.<sup>2</sup> Data not available at time of report submittal.